

AN EMPIRICAL ANALYSIS OF FACTORS THAT INFLUENCE THE FIRST  
YEAR TO SECOND YEAR RETENTION OF STUDENTS AT ONE LARGE,  
HISPANIC SERVING INSTITUTION (HSI)

A Dissertation

by

STEVEN LAMAR WILKERSON

Submitted to the Office of Graduate Studies of  
Texas A&M University  
in partial fulfillment of the requirements for the degree of  
DOCTOR OF PHILOSOPHY

August 2008

Major Subject: Educational Administration

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Approved by:

Chair of Committee,	Fred Bonner II
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## ABSTRACT

An Empirical Analysis of Factors That Influence the First Year to Second Year Retention of Students at One Large, Hispanic Serving Institution (HSI). (August 2008)

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The purpose of this study was to identify how input and environmental factors impact first-to-second year retention of undergraduate students at a large Hispanic Serving Institution (HSI). An additional purpose of the study was to determine the usefulness of the Astin Typology as a predictive factor for student retention. The sample for the study was 1,296 first-year students enrolled at the University of Texas at San Antonio during the 2002, 2003, and 2004 academic years.

Data used for the study included student responses to the *Cooperative Institutional Research Program (CIRP): Freshman Survey* (to identify each participant's Astin type), gender, ethnicity, SAT scores, rank in high school class, first-generation status, financial need, first-semester residence, entry-college, semester credit hours attempted, academic course difficulty, participation in Supplemental Instruction, and enrollment in a first-year seminar course. Both

descriptive and univariate statistics were used to describe the sample population, as well as the similarities and differences found to exist among the seven Astin types. Three separate logistic regression analyses organized by Astin's I-E-O framework were conducted to develop a predictive model for retention from the first-to-second year of college. Subsequent analyses were conducted to identify the specific factors that were useful for predicting retention for each of the seven Astin types.

The major findings of this study were:

- The most frequent Astin type identified within the sample population was *Status Striver*
- The model that included both Input and Environmental factors was the most accurate model for predicting retention
- Students who were classified as *Hedonist*, *Status Striver*, and *Uncommitted* were less likely to be retained at this institution when all other input and environmental factors were controlled.
- Environmental factors were most useful for predicting retention, in particular, semester credit hours attempted that had an inverse relationship with retention for all Astin types
- First-generation status, financial need, SAT score were not useful for the prediction of retention
- First-year seminar course enrollment and participation in Supplemental Instruction had a positive impact on retention

This study provided evidence that the Astin typology is viable as a means of retention among college student populations.

## DEDICATION

This dissertation is dedicated to three people in my life who have made me the person I am today and the person I want to be in the future.

To Amanda, my beautiful, gifted, and infinitely patient wife - You are the center of my universe and the shining star that guides me toward being a better person. Thank you for supporting my aspirations and sharing our life together. I love you.

To my parents - Your sacrifices gave me the privilege of being the first person in our family to attend college. Mom, thank you for teaching your children to love absolutely and to use our talents to help others. Dad, although no longer with me in body, your spirit remains. Thank you for teaching your children to work hard and to expect excellence. Dad, it is my fervent hope that you are as proud of this accomplishment as I am of you.

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## CHAPTER I

### INTRODUCTION

Successfully completing the first year of college is the greatest single hurdle for a student to navigate if that student is to persist through graduation. According to Tinto (1996), “Nearly 57 percent of all drop-outs from four year institutions leave before the start of their second year” (p.1). Additionally, Tinto found that the attrition rate decreases by one-half each subsequent year a student remains enrolled in college. This phenomenon has prompted a great deal of interest in the area of undergraduate persistence among higher education scholars during the past 30 years (Astin, 1975a; Bean, 1980; Braxton, 2000; Cabrera, Casteneda, Nora, & Hengstler, 1992; Seidman, 2005; Tinto, 1993).

Research by many of these scholars reflects what has been reported to be stagnant six-year graduation rates where slightly more than 50% of those students who first enrolled in a four-year institution go on to graduate in six years or less (National Center for Education Statistics [NCES], 2005). The impact of low degree completion rates has far reaching consequences for the student, the institution, and society-at-large (Tinto, 1993). Thus, it is critical for institutions of higher education to note that an increase in retention efforts from the first to the second year in college can significantly influence student persistence and subsequent graduation.

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This dissertation follows the style and format of the *Journal of Higher Education*.

With increasing diversity on college and university campuses, also noted has been the amount of diversity and variation in student educational backgrounds, which has led to the implementation of programs and services to promote persistence and to increase retention (Cabrera, Burkum, & La Nasa, 2005; Levitz, Noel, & Richter, 1999). Retention is important in that it is viewed as an indicator of effective institutional practice and accountability to internal and external shareholders. Retention is an institutional measure of those students who are enrolled one year after beginning their first year of college (Astin, 1997). Nationally, this figure ranges from 54.6% to 92.8% of the entering first-year student class at public, doctoral degree granting universities (American College Testing [ACT], 2005). More regionally, particularly in the state of Texas, since 2000 the overall retention rate among four-year institutions has remained near 75%, while student enrollment at these institutions has increased by 18% (Texas Higher Education Coordinating Board [THECB], 2007b). The implications for the rising number of students and the static retention rate is that higher education institutions are not providing adequate support mechanisms to promote retention within the expanding student population.

The enrollment and retention rates are clearly reflected in the shifting demographic trends we have witnessed and will continue to witness across the state. According to Murdock, White, Hoque, Pecotte, You, and Balkan (2002) the demographics of Texas will change dramatically over the next (30) years. As the future composition of Texas' potential college student population is forecasted to



change, Texas colleges and universities have been challenged through the Texas Higher Education Coordinating Board's *Closing the Gaps by 2015: The Texas Higher Education Plan (Closing the Gaps)* initiative; this initiative is to serve a broader population of students with varied levels of preparation. Expanded access to higher education is the first benchmark of the *Closing the Gaps* initiative (Texas Higher Education Coordinating Board [THECB], 2000).

Beyond providing access, a challenge that faces all institutions is enhancing student success, which is the second major benchmark of the *Closing the Gaps* initiative. The outcome measures used to successfully address this benchmark articulated in the initiative include student retention and persistence; specifically retention from the first to the second year and degree completion (Texas Higher Education Coordinating Board [THECB], 2004). One higher education system in particular, The University of Texas system, in response to *Closing the Gaps* identified increasing student graduation rates as a top priority for the next (10) years (University of Texas System, 2006). The second largest institution in this particular system, the University of Texas at San Antonio (UTSA), has embarked on an institution-wide effort to examine ways to improve retention and graduation rates by mainly focusing on expanding academic support programs, such as Supplemental Instruction (SI) and first-year seminar courses, and academic advising services.

Since the Fall of 2001, the University of Texas at San Antonio (UTSA) has reported a retention rate between 62% and 64% (Office of Institutional

Research, 2006). Over 50% of the students who depart UTSA before the sophomore year leave the institution due to academic reasons (Glenn, Guerra, Hample, Leal, Recio, Reynolds, Ryan, Utecht, Williams, & Wolf, 1997). A driving force behind UTSA's efforts to not only focus on but also improve retention rates has been the recent trend towards performance based formula funding systems that examine retention and/or graduation rates, and create additional pressures to provide support mechanisms to undergraduate students (Bloese, 1999; Metz, 2004). Under this funding paradigm, institutions have a financial incentive to increase student retention and/or graduation rates, but often do not have the specific knowledge needed to improve these outcomes and receive those funds linked to enhanced academic performance. The lack of specific knowledge has prompted the use of generalized and voluntary approaches to student support (Antley, 1999; Arendale, 1994; Cutright, 2002). The support mechanisms highlighted in the literature (Cutright, 2002) include seminar courses, learning communities, peer tutoring, and Supplemental Instruction and UTSA has implemented all of these programs to promote retention. However, in an environment of limited resources it is increasingly important to direct support efforts toward those students most at-risk of leaving the institution (Glynn, Sauer, & Miller, 2003).

As a means of determining the most effective support mechanisms for early identification of students who will persist at UTSA through graduation, a predictive model provides a capacity to be proactive in the provision of support

and engage students more fully in the university environment (Metz, 2004). Several theories and models have attempted to explain the factors associated with a student's decision to remain in school or to leave (Astin, 1975a; Bean, 1980; Cabrera, Casteneda, Nora, & Hengstler, 1992; Milem & Berger, 1997; Tinto, 1975, 1987, 1993). Additionally, there have been numerous theories that have identified both student academic and social integration as critical factors in student persistence (Astin, 2001; Braxton, 2000; Tinto, 1993). In all of these persistence theories, the interaction between students and the institutional environment is important to understand persistence and retention. Although these commonalities have been identified, it remains difficult for institutions to determine which students will persist within a specific institutional environment. Therefore, the design and delivery of programs to support individual students' educational goals remains problematic (Antley, 1999).

One approach used to address the complex nature of student retention research is to use a typology system to classify groups of students with similar "values, attitudes, beliefs, self-concept, and behaviors" (Astin, 1993b) or by the activities in which they engage (Kuh, Hu, & Vesper, 2000). One empirically based typology, Astin's typology--based on a factor analysis of 10,000 cases from the Cooperative Institutional Research Program (CIRP) longitudinal data file, has proven to provide a comprehensive view of college student populations. Based on this typology, Astin identified and described seven distinct personality types labeled: Scholar, Social Activist, Artist, Hedonist, Leader, Status Striver,

and Uncommitted Student. The use of these Astin types in empirical research on student retention has been limited (Miller, 2004). Additionally, research on this topic has not generated a predictive model that provides critical information on the interaction of Astin's typology; environmental factors of academic course difficulty and support programs; and student retention. A major benefit in developing a localized predictive model of student retention is that such a model would incorporate a typology that could be communicated to students and their parents as well as university faculty and staff during discussions of student persistence and retention. In addition, the methodology used to develop this localized predictive model can be replicated at other institutions based on their specific context. From this model, an institution is able to identify and to use key factors that impact student retention and to be more purposeful in applying programs and interventions to increase retention (Astin, 1993a; Glynn, Sauer, & Miller, 2003; Tinto, 1996).

Astin's Input-Environment-Output (I-E-O) model will provide the conceptual framework for this study. Astin (1993b) defines inputs as the personal qualities a student brings to their entry into the university, and the environment refers to the student's experience at the university. Outputs are outcomes that are dependent on the interaction of the student and the environmental variables. For this study, the input variables will be Astin type, gender, ethnicity, SAT scores, rank in high school class, first-generation status, and financial need; environmental variables will consist of first-semester

residence, entry-college, semester credit hours attempted, academic course difficulty, participation in Supplemental Instruction, and enrollment in a first-year seminar course; the output variable will be first-to-second year retention.

### **Statement of the Problem**

The lack of a general model to predict first-to-second year retention has left institutions with little information and few choices in developing programs and implementing policies to increase this measure. Thus, efforts have been at best loosely coupled and at worst haphazard in their approach to a complex problem created by the interaction between the student and the institutional environment. There has been limited development of sophisticated local models that incorporate a wide range of student and institutional factors. However, the information provided through this type of model is critical for institutional policy-making and program implementation to increase student retention.

### **Purpose and Research Questions**

The primary purpose of this ex post facto study is to identify factors that impact first-to-second year retention of selected undergraduate students who first enrolled at the University of Texas at San Antonio for the fall semesters of 2002, 2003, 2004.

More specifically, the study will address the following questions:

1. To what extent do the pre-entry (input) factors (gender, ethnicity, first-generation status, financial need, SAT scores, rank in high school class, and Astin type derived from the *Cooperative Institutional Research*

*Program (CIRP) Freshman Survey*) predict retention (output) of selected undergraduate students at the University of Texas at San Antonio?

2. To what extent do the Astin type (input) and post-entry (environmental) factors (first-semester residence, entry-college, semester credit hours attempted, academic course difficulty, enrollment in a first-year seminar course , and participation in Supplemental Instruction) impact retention (output) of selected undergraduate students at the University of Texas at San Antonio?
3. To what extent does the combination of pre-entry factors (inputs), post-entry factors (environmental) impact selected undergraduate student retention (output) of freshmen at the University of Texas at San Antonio?
4. To what extent does the combination of pre-entry factors (inputs), post-entry factors (environmental) impact the retention of students identified as a particular Astin type at the University of Texas at San Antonio?

### **Operational Definitions**

**Academic Course Difficulty:** A measure of the percentage of all students receiving a grade in the course who received grade of either a 'D' or an 'F'. A student participant's first-semester academic course difficulty is the weighted average difficulty of all the college-credit, letter-graded courses in which they were enrolled (Szafran, 2001).

**Astin Type:** A categorical variable based on Astin's (1993b) student typology based on responses to the *Cooperative Institutional Research Program (CIRP)*

*Freshman Survey.* Astin types include Scholar, Social Activist, Artist, Hedonist, Leader, Status Striver, and Uncommitted Student.

**Banner:** The student record-keeping database (Banner) used at the University of Texas at San Antonio contains academic (grade point average (gpa), grades, test scores, etc.), demographic (gender, ethnicity, etc.), and personal information (address, phone, etc.) for each student enrolled at the university (Office of Information Technology, 2006a).

**Cooperative Institutional Research Program (CIRP) Freshman Survey:** A self-report instrument developed by Higher Education Research Institute (HERI) located at the University of California, Los Angeles. The survey is administered annually at over 700 United States colleges and universities. It is the oldest and most widely administered higher education survey with data for over 1,800 institutions and over eleven million students (Higher Education Research Institute, 2006).

**Entry-College:** A categorical variable based on the student's initial college major recorded in Banner based on the student's admission application. Choice of entry college includes: Business, Education, Liberal and Fine Arts, Sciences and Engineering, and Undecided (University of Texas at San Antonio, 2000).

**Financial Need:** A categorical variable based on family income on UTSA Financial Aid Office records contained in the Banner system. Categories include low income, lower middle, upper middle, high income, and non-aid applicant (St. John, Hu, Simmons, Carter, & Weber, 2004).

**First-generation Status:** A dichotomous variable based on the highest parental educational level reported on the admission application was used to determine first-generation status. If neither parent graduated from college, the student will be classified as a first-generation student (Ishitani, 2006; Pascarella, Pierson, Wolniak, & Terenzini, 2004a).

**First-semester Residence:** A dichotomous variable based on a student's place of residence during their first semester enrolled either "on-campus" or "off-campus resident" (Jacoby & Garland, 2004).

**First-year Seminar:** A three-credit hour course in a small class setting that fulfills a core curriculum requirement in the area of Social and Behavioral Sciences that includes activities designed to promote a successful transition to the university (University of Texas at San Antonio, 2006a).

**Grade Point Average (GPA):** Based on a 4.0 scale, where the value of a grade of "A" = 4, "B" = 3, "C" = 2, "D" = 1, and "F" = 0. The UTSA grade point average is determined by dividing the number of grade points earned at UTSA by the number of for-credit semester credit hours attempted at UTSA (University of Texas at San Antonio, 2006b).

**Learning Communities:** A voluntary program through which a cohort of 25 students are enrolled in a common set of courses that includes a first-year seminar course, and a least one general education course, e.g. history, biology, psychology (University of Texas at San Antonio, 2006b).



**Rank in High School Class:** The rank is the highest rank in class as indicated on a first year student's high school transcript and recorded in Banner to determine admission to the University (University of Texas at San Antonio, 2006b).

**Retention:** Students who are enrolled for their second fall semester will be classified as "persistors" and students who do not return will be classified as "non-persistors" (Glynn, Sauer, & Miller, 2003).

**SAT Scores:** The score used will be the highest composite score for a first year student on either the SAT or ACT test. ACT scores will be converted to SAT scores using a conversion chart (College Board, 2007).

**Semester Credit Hours Attempted:** The number of hours attempted is the total number of semester credit hours for which a student has enrolled and received grades of "A," "B," "C," "D," "F," "W," or "CR" except as provided for repeated courses and recorded in student information system (Banner) (University of Texas at San Antonio, 2006b).

**Student Participant:** First-time in college, degree seeking, first semester UTSA student who completed a *Cooperative Institutional Research Program (CIRP) Freshman Survey* during mandatory summer orientation before matriculation; enrolled in at least one course supported by Supplemental Instruction; and provided family income information as part of the financial aid application process.

**Supplemental Instruction (SI)**: A voluntary academic assistance program designed to increase academic performance by providing peer-facilitated study sessions for students enrolled in courses that have been labeled “gatekeeper courses.” These courses are labeled as such due to the high number of ‘D’, ‘F’ or ‘W’ (Withdrawal) grades earned as final course grades (Tomás Rivera Center for Student Success, 2006). The peer-facilitators (SI Leaders) are students who have successfully completed the targeted course and have been trained in the use of selected collaborative learning and study strategies during their facilitation of the study sessions.

**Supplemental Instruction Participation (SI)**: Students who attend at least one Supplemental Instruction session during the first semester enrolled in college, as determined by SI program records will be considered participants in the program (Arendale, 1994).

**University of Texas at San Antonio (UTSA)**: UTSA is a metropolitan, comprehensive public university offering (62) bachelor's, (43) master's and (18) doctoral degree programs. UTSA is classified as a Master's L: Master's Colleges and Universities (Larger program) under the current Carnegie Classification (The Carnegie Foundation for the Advancement of Teaching, 2007). More than 57% of UTSA's students come from groups underrepresented in higher education, and more than 42% are Hispanic. UTSA is ranked fifth among all U.S. universities in the number of bachelor's degrees granted to Hispanic students (Office of Information Technology, 2006b).

## **Assumptions and Limitations**

### *Assumptions*

1. The data extracted from the University of Texas at San Antonio for use in this study are accurate.
2. Self-reported data such as ethnicity and first-generation status are accurate.
3. Astin types derived from the *Cooperative Institutional Research Program (CIRP) Freshman Survey* are measurable.

### *Limitations*

1. Findings can be generalized only to the population from which the sample was drawn at the University of Texas at San Antonio.
2. This analysis is limited to new freshmen at the University of Texas at San Antonio who matriculated in Fall 2002, Fall 2003, and Fall 2004 who completed the *Cooperative Institutional Research Program (CIRP) Freshman Survey* and consented for their responses to be used by the University for research purposes.
3. Data were obtained from only one institution, the University of Texas at San Antonio.
4. The *Cooperative Institutional Research Program (CIRP) Freshman Survey* was not specifically designed to classify respondents into student types.

5. Several of the variables are based on self-report data that may not be reliable.
6. The impact of variables other than the selected input and environmental variables are not addressed.

### **Significance**

Student persistence has far-reaching implications for higher education. According to Peltier, Laden, and Matranga (1999), "Research on student persistence has taken on new importance due to the considerable competition for students among colleges and universities" (p. 357). For many years, universities and colleges have provided support services to prevent student departures, but the persistence rate has changed little (Braxton, 2000). Astin, Tsui, and Avalos (1996) found that only 44.9% of students complete a bachelor's degree within six years and if students were allowed nine years, the graduation rate had a modest increase to 45.7%. Tinto (1993) estimated that 15 to 25% of the students departing institutions do so due to academic reasons. The academic dismissal rate is even greater for "commuter" campuses, such as UTSA (Astin, 2001). However, the caveat "success of an institution and the success of its students is inseparable" (Levitz, Noel, & Richter, 1999, p. 31) remains true for colleges and universities.

The predictive model developed through this study will provide insight regarding the factors that impact student retention from the first to the second year at the University of Texas at San Antonio. The University can use the

findings of this study to promote student retention that will ultimately increase degree completion rates. This study provides a framework for educators to assist new students in making appropriate educational choices. First, the development of a predictive model will inform university policy-making and program decisions. An understanding of the relationships between pre-entry factors and environmental factors that impact student persistence will facilitate the creation of targeted, intentional programs to promote student retention. Second, the model will examine the impact that academic load has on student retention. An understanding of this relationship aids both academic advisors and students in course scheduling choices during the first semester of college. Third, the model will illustrate the effectiveness of Supplemental Instruction and/or first-year seminar courses in lowering a participant's risk of attrition.

Given the wide acceptance and implementation of Supplemental Instruction (International Center for Supplemental Instruction, 2007) and first-year seminar courses (Goodman & Pascarella, 2006) and these programs' history of effectiveness, questions often arise as to why more students do not take advantage of these support programs. Additionally, questions are also asked about how educators can encourage greater numbers of entering students to participate in these initiatives. This study will provide empirical evidence that will substantiate the importance of these programs as they impact student retention. A predictive model that incorporates a typology based on student attitudes, values, and expectations with pre-enrollment data and

environmental factors offers a mechanism for the University to develop "policies and practices...[that] support the alignment of student interests and efforts with the achievement of institutional strategic goals" (Luo & Jaimeson-Drake, 2005). Although the study is limited to a single institution, the data selected for development of the model are commonly available at a wide range of institutions that can be used to better align access and success among student populations to promote retention, persistence, and degree completion.

## CHAPTER II

### REVIEW OF THE LITERATURE

This review of the literature is organized in four sections. The first section provides a theoretical background of student retention research. The second examines college student typologies developed since 1960. The third section presents a synopsis of Astin's Input-Environment-Outcome model and its value as an organizing construct for the study of college student populations, and the final section contains a review of research literature related to the variables selected for inclusion in this study.

Earning a college degree has become increasingly important for individuals to participate and succeed in an information rich society. In addition to the increasing importance of obtaining a degree has come the simultaneous need to focus on the growing number of college students who are seeking to earn a degree in their efforts to participate fully in this society. According to Pascarella (2006), research on college students is "perhaps the single largest area of inquiry in the field of higher education" (p. 508) and the number of investigations is expanding. Participating in higher education and earning a degree provides benefits to the individual as well as to society. One benefit provided to individuals is an economic one, for example, Day and Newburger (2002) demonstrated that those who completed a bachelor's degree earned nearly double the salary that their counterparts who only completed a high school diploma earned. Beyond these apparent economic benefits, degree

recipients and their offspring have been found to be more open-minded, more rational, and less authoritarian (Rowley & Hurtado, 2003). For society at large, these qualities translate into reduced crime rates, increased community service, increased civic participation, i.e. voting, increased appreciation for diversity, and increased use of technology (Institute for Higher Education Policy, 1998).

Even though these private and public benefits are well documented and widely communicated, the National Center for Education Statistics [NCES] (2007) reported that only 52.6% of the students who first enrolled at a public four-year institution in 1999 graduated six years later. More alarming is the fact that within this same population, the six-year graduation rate for Hispanic students and Black non-Hispanic students is 41.8% and 38.1% respectively. A previous study estimated that 16% of first-time undergraduates in public four-year institutions do not return for their second year and of these students 36% did not return to higher education (Horn & Carroll, 1998).

Understanding why so few students find success in higher education and why there are such dramatic differences in outcomes among different student populations has prompted a subset of college student inquiry classified as “dropout,” “student success,” “retention,” or “persistence” research that is focused on student enrollment and degree attainment outcomes (Seidman, 2005). College student retention has been a topic of investigation for many scholars for the past 30 years. As a result, a plethora of research attempting to explain student retention through various perspectives (e.g. psychosocial,



economic, policy and societal, organizational) has been disseminated (Braxton, Sullivan, & Johnson, 1997).

Despite the attention given to the topic of student retention, in many ways the literature continues to be limited. Smart, Feldman, and Ethington (2006) cite three primary reasons for this lack of understanding of student success: (a) current conceptual models are too broad and/or incomplete, (b) research has been focused on student behaviors, and (c) a decline in the number of studies about college environment's impact on student success have been undertaken. However, in a recent summary of retention research, Bean (2005) posited that student retention is influenced by nine themes:

1. A student's intention to remain enrolled at the institution;
2. A student's fit within the institutional environment and commitment to the specific institution;
3. A student's perception of their own ability to be successful, student engagement in activities that promote success, e.g. studying, attending class, etc., and locus of control (external or internal);
4. A student's academic performance e.g. grades, GPA;
5. A student's social environment that includes factors inside as well as outside of the institution;
6. A student's interaction with campus offices and services such as advising, housing; and academic support services and the perceived cost in terms of time, money, effort compared to the perceived value received;

7. A student's situation outside the institution e.g. family responsibilities, work, etc.
8. A student's background that includes factors such as high school rank, standardized test scores, parent's education and income; and
9. A student's financial means and ability to pay.

These themes have been explored in past studies; hence, a focus on the history and background of major retention theories associated with these themes is warranted to provide a context for this study.

### **Historical Background of Retention Theories**

#### *Spady's Sociological Model of the Dropout Process*

The roots of retention theory are often traced back to the work completed by Spady (1970) who is widely recognized as the first researcher to develop an empirically-based model to explain student attrition. In creating the model, he applied the work of Durkheim to his development of a college student attrition conceptual model. Durkheim (1952) posited that some suicides are due to a lack of social integration in that "the bond attaching man to life relaxes because that attaching him to society is itself slack" (p. 173). Durkheim suggested that two types of social integration increase the probability of an individual committing suicide (a) incongruence with the moral code of the social system; and (b) limited interaction with others. From Durkheim's work, Spady attributed the social integration of students into higher education to (a) normative congruence, a student's compatibility with the institutional environment; and (b) friendship

support, having close on-campus relationships (Spady, 1970). He theorized that other factors such as family background, academic potential, grade performance, and intellectual development factors also influence social integration. An indirect relationship was posited to exist between social integration and attrition, with a student's satisfaction and commitment to the institution serving as intervening variables that can attenuate attrition. However Spady (1970) noted a direct relationship between grade performance and attrition; notwithstanding a high level of social integration, satisfaction, or commitment, a student may withdraw due to low academic performance. Spady's sociological model represents the initial attempt at developing a theory to describe student attrition and this model has primarily served as a foundation for subsequent research that has been conducted on this topic.

#### *Tinto's Student Integration Model*

Tinto (1975) expanded the work of Spady by developing a longitudinal model of the attrition process by extending Spady's original work that solely described the conditions that influence attrition. It is important to recognize, Tinto's goal was to produce a model for study of student attrition at a single institution rather than across multiple institutions. Tinto theorized that the level of student commitment to attaining a degree and commitment to the institution mediate integration into the academic and social systems of the institution. He acknowledged that family background, individual attributes, and previous educational experiences exert an influence on the development of student

commitment as well as the intensity of student commitment toward the institution and toward degree completion. Further, Tinto suggested that student interactions within the academic and social systems of the institution can either reinforce or weaken student commitment to (a) degree completion, (b) the institution, or (c) both degree completion and the institution, and ultimately the decision to remain enrolled or withdraw. As part of Tinto's model, which became known as his "departure theory," he posited that students often weigh the benefit of continued enrollment against other competing activities, such as employment or transfer to another institution.

Tinto (1987) revised his student integration model based on the social anthropologist Arnold Van Gennep's (1960) *rites of passage* by integrating stages of separation, transition, and incorporation into the model. Van Gennep's stages describe the process of moving into adulthood within a society. Tinto sought to draw parallels between the transition into adulthood and the process of a student transition into the college or university context. The initial stage of Tinto's model, *separation*, "requires students to disassociate themselves, in varying degrees, from membership in the past communities" (p. 443). The second stage, *transition*, is one of beginning the process of moving toward integration into the social and academic systems of the college or university community. Successful navigation through the first two stages may represent a significant challenge for students based on their background, personality, and coping mechanisms. During the final stage, *incorporation*, the student initiates

the process of “finding and adopting norms appropriate to the new college setting and establishing competent membership in the social and intellectual communities of college” (p.446).

Tinto (1993) expanded his original model to include “adjustment, difficulty, incongruence, isolation, finances, learning, and external obligations or commitments” (p. 112). Tinto’s work has served as the theoretical foundation upon which much of the research related to student attrition inquiry is based. Although a major contribution to the field, John Bean (1980) pointed out that Tinto’s model failed to adequately address the importance of the external environment, as well as student attitudes and values in student attrition.

#### *Bean’s Model of Student Attrition*

Bean (1980, 1982) approached the study of college student attrition through a model based on research about turnover in the workplace. In addition, Bean’s *model of student attrition* included the role of student attitudes and intentions in the attrition process. He noted that Tinto’s *theory of student departure* failed to acknowledge the importance of external factors in developing a model of student attrition. Therefore in this model, Bean proposed five sets of variables: (a) background, e.g. socioeconomic, past educational performance; (b) organizational, e.g. grades, faculty contact, courses; (c) environmental, e.g. opportunity to transfer, ability to pay, familial support; (d) intention to leave; and (e) attitudinal, e.g. satisfaction, usefulness, and loyalty. Bean posited that these variables and the interaction between them influence student retention.

Bean and Metzner (1985) acknowledged that the previous student attrition theories addressed only traditional students, i.e., those students who live on-campus, enter college directly after high school, and enroll on a fulltime basis. Thus, they developed a *model of nontraditional student attrition* to address this growing population of students. The *nontraditional student attrition model* was based on four groups of variables: (a) background, e.g. age, gender, residence, high school performance; (b) academic, e.g. study habits, course availability, academic advising, absenteeism, which have a direct impact on grade point average; (c) psychological, e.g. satisfaction, stress, goal commitment that have a direct effect on the intent to leave; and (d) environmental, e.g. finances, opportunity to transfer, hours working, family responsibilities, outside encouragement. As opposed to traditional student attrition models, wherein social integration influences attrition; Bean and Metzner posited that for nontraditional students the external environment exacted a greater influence on attrition than social integration into the college environment. Astin (1984) noted that Tinto's *theory of student departure* and Bean's *model of student attrition* model were too complex to be useful for guiding educational practice.

#### *Astin's Student Involvement Theory*

Astin (1975b) found that environmental factors such as living on-campus, participation in extracurricular activities, and part-time on-campus employment all had a positive effect on retention. However, he posited that the best

predictors of retention are proven to be student past academic performance and academic ability. Based on these findings, Astin (1984) advanced the theory of “student involvement” based on a longitudinal study of institutional factors and college dropouts. He noted that a major appeal of the proposed theory was that it was simple and did not require elaborate diagrams to illustrate it. Astin defined involvement as “the physical and psychological energy that the student devotes to the academic experience” (p.297). Astin proposed that the more a student is involved, the more likely they would learn, develop, and persist.

An important aspect of Astin’s *student involvement theory* was an acknowledgement that colleges and universities have to compete with the external environment for a student’s time and energy. Therefore, he suggested educators should remain cognizant of the limited nature of these two student commodities in developing policies and practices. Although Astin’s *student involvement theory* and Bean’s *model of student attrition* are considered major contributions to the field, the influence of Tinto’s *student integration model* has been so profound that Braxton (2004) referred to his work as “paradigmatic” (p. 2). However, several scholars (Cabrera, Casteneda, & Nora, 1993; Milem & Berger, 1997) have considered whether Tinto’s student integration model could be improved by including elements from both Bean’s *model of student attrition* and/or Astin’s *student involvement theory*.

### *Integrated Model of Student Retention*

Cabrera, Casteneda, Nora, and Hengstler (1992) examined, empirically, whether Tinto's *student integration model* (1975, 1987), Bean's *student attrition model* (1980, 1982) or a combination of these two models would provide a better understanding of the attrition process. Their study validated the concept advanced by both models that student persistence is influenced through complex interactions between the individual and certain institutional factors. Agreeing with Bean, they noted that Tinto's *student integration model* failed to recognize the importance of environmental factors such as finances, opportunity to transfer, and outside encouragement. Therefore, these researchers suggested that a model that combined Tinto's *student integration model* and Bean's *student attrition model* would provide an improved model to explain student attrition.

A follow-up study by Cabrera, Casteneda, and Nora (1993), supported a model that combined Tinto's *student integration model* and Bean's *student attrition model* to explain the attrition process. These researchers found that intent to persist had the largest impact on persistence; followed by GPA, institutional commitment, encouragement from family and friends, goal commitment, academic integration, finance attitudes, and social integration. Cabrera, Casteneda, and Nora suggested an *integrated model of student retention* that included intent to persist and environmental factors such as encouragement from family and friends, elements found in Beans' *student*



*attrition model*. Additionally, they included academic integration, social integration, institutional commitment and goal commitment elements found in Tinto's *student integration model* to produce an integrated and improved model of student persistence.

#### *Modified Model of College Student Persistence*

Milem and Berger (1997) empirically tested a conceptual model that integrated behavioral measures from Astin's (1984) *student involvement theory* with measures of social and academic integration found in Tinto's (1975, 1993) *student integration model*. They proposed that student integration into the academic and social systems at a college or university is based on student behaviors and that it is student perceptions of their integration into the institution that influences future behaviors such as withdrawal. Namely, these researchers posited that students (a) enter the institution with various levels of institutional commitment; (b) interact with their peers and faculty, and participate in organized campus activities to different degrees; and these "involvement measures" influence both (c) academic integration; and (d) social integration; that directly impact student attrition. A key finding of their study was that student involvement within the first six to seven weeks of their first semester, influences student perceptions of their experience and reinforces future involvement especially through faculty interactions such as talking outside of class. Although these theorists combined Tinto's model and subsequently identified a number of key findings related to student attrition, several scholars have questioned the

methodological and theoretical underpinnings of the Tinto model--one scholar in particular is John M. Braxton.

*Braxtons' Student Departure Puzzle*

In a study to establish the internal consistency of Tinto's model, Braxton, Sullivan, and Johnson (1997) identified 15 testable propositions contained in Tinto's 1975 model and through an investigation of peer-reviewed multi-institution and single institution research studies they determined which propositions had empirical support. As seen in Table 1, most of the support for the testable propositions was observed in single institution studies.

It was determined by these researchers that propositions three (3), eight (8), nine (9), twelve (12), and thirteen (13) were essential to Tinto's *student integration model* since each one depicts a direct relationship with one of Tinto's key factors *the greater the level of academic integration, the greater the level of subsequent commitment to graduation (8); the greater the level of social integration, the greater the level of subsequent commitment to the institution (9);* or student attrition (3, 12, and 13). Based on the percentage of studies that supported a given proposition, these researchers categorized the support for it as strong, moderate, weak, no support, indeterminate, or not tested (Braxton, Sullivan, & Johnson, 1997, p. 110).

**Table 1**  
**Support for Each of Tinto's Testable Propositions**

Proposition	Multiple Institution Studies	Single Institution Studies
1. Student entry characteristics affect the level of initial commitment to the institution	Moderate	Strong
2. Student entry characteristics affect the level of initial commitment to the goal of graduation from college	Strong	Moderate
<b>3. Student entry characteristics directly affect the student's likelihood of persistence in college</b>	<b>Moderate</b>	<b>Weak</b>
4. Initial commitment to the goal of graduation from college affects the level of academic integration	Weak	Moderate
5. Initial commitment to the goal of graduation from college affects the level of social integration	No support	Moderate
6. Initial commitment to the institution affects the level of social integration	Weak	Weak
7. Initial commitment to the institution affects the level of academic integration	Weak	Weak
<b>8. The greater the level of academic integration, the greater the level of subsequent commitment to the goal of graduation from college</b>	<b>Moderate</b>	<b>Moderate</b>
<b>9. The greater the level of social integration, the greater the level of subsequent commitment to the institution</b>	<b>Moderate</b>	<b>Strong</b>
10. The initial level of institutional commitment affects the subsequent level of institutional commitment;	Strong	Strong
11. The initial level of commitment to the goal of graduation from college affects the subsequent level of commitment to the goal of college graduation	Strong	Strong
<b>12. The greater the level of subsequent commitment to the goal of college graduation, the greater the likelihood of student persistence in college</b>	<b>Strong</b>	<b>Weak</b>
<b>13. The greater the level of subsequent commitment to the institution, the greater the likelihood of student persistence in college</b>	<b>Moderate</b>	<b>Strong</b>
14. A high level of commitment to the goal of graduation from college compensates for a low level of commitment to the institution, and vice versa, in influencing student persistence in college	Moderate	Strong
15. A high level of academic integration compensates for a low level of social integration, and vice versa, in influencing student persistence in college.	Not tested	Strong

**Bold** denotes an *essential* proposition of the Tinto model.

Adapted from Table 1 (pg. 131) In Braxton, J., Sullivan, A., & Johnson, R. (1997). Appraising Tinto's theory of college student departure. In J. C. Smart (Ed.), *Higher Education: Handbook of Theory and Research*. New York: Agathon with kind permission of Springer Science and Business Media.

Several studies affirmed the importance of many of the propositions in Tinto's model, but inconsistent support for those essential propositions depicting a direct influence on attrition was found. Strong support for *the greater the level of subsequent commitment to the goal of college graduation, the greater the likelihood of student persistence in college* (12) was demonstrated in multi-institutional studies. While, single institution studies demonstrated strong support for two essential propositions (a) *the greater the level of social integration, the greater the level of subsequent commitment to the institution* (9); and (b) *the greater the level of subsequent commitment to the institution, the greater the likelihood of student persistence in college* (13). In addition, only weak to moderate support for *student entry characteristics directly affect the student's likelihood of persistence in college* (3) was observed in single institution studies and in multi-institutional studies, respectively.

Mixed support for other propositions depicting an indirect relation with attrition was also found. Very strong support was observed in both multi- and single institution studies for *the initial level of institutional commitment affects the subsequent level of institutional commitment* (10); and *the initial level of commitment to the goal of graduation from college affects the subsequent level of commitment to the goal of college graduation* (11). Strong support was demonstrated by multi-institutional studies for *entry characteristics affect the level of initial commitment to the goal of graduation from college* (2). While, single institution studies demonstrated strong support for *entry characteristics*

*affect the level of initial commitment to the goal of graduation from college (1); the greater the level of social integration, the greater the level of subsequent commitment to the institution (9), a high level of commitment to the goal of graduation from college compensates for a low level of commitment to the institution, and vice versa, in influencing student persistence in college (14); and a high level of academic integration compensates for a low level of social integration, and vice versa, in influencing student persistence in college (15).*

In studies that included gender, strong support was found for *the greater the level of social integration, the greater the level of subsequent commitment to the institution (9)* in studies of male students, while the remaining propositions had only limited support. In studies that included gender and ethnicity, different levels of support was found for *student entry characteristics directly affect the student's likelihood of persistence in college (3)*; whereas, studies of White men and women demonstrated strong support, studies of African American men demonstrated moderate support, and studies of African American women demonstrated no support.

Based on these mixed findings of empirical support, Braxton, Sullivan, and Johnson proposed that a revision of Tinto's *student integration model* was needed explain the student attrition process. Although, they noted the Tinto model remains a useful tool for studying college student attrition within a single college or university setting.

Braxton and others continued the analysis of Tinto's model and developed a revised model based on those constructs that had garnered empirical support (Braxton, Hirschy, & McClendon, 2004; Braxton & Lien, 2000) . They proposed that the complexity of student attrition requires a multi-theoretical approach, one that incorporates economic, organizational, psychological, and sociological approaches. In addition, these researchers proposed that different conceptual models of student attrition be used for different types of institutions; namely, residential versus commuter campuses based on the differences in factors that influence student attrition in these different settings. The model proposed for residential colleges and universities was based on the empirical support observed in the early study; these researchers posited that (a) students have different entry characteristics including the "ability to pay" that influence, (b) the initial commitment to the institution that impacts, (c) student perceptions of the institution, (d) engagement with the social opportunities available that influences, (e) social integration, and (f) subsequent institutional commitment that directly impact persistence. In developing a model for commuter colleges and universities, these researchers posited that (a) students have different entry characteristics such as motivation, parental education, and self-efficacy (i.e. the belief in capability to achieve) that influence; (b) the initial commitment to the institution that influences their adjustment to; (c) the external environment (e.g., finances, work, family); (d) the campus environment (e.g., academic communities, active learning, cost) that have an impact on; (e) the subsequent

institutional commitment that has a direct impact on persistence. A major difference between these two models is found in the factors that directly impact persistence. One model suggests that institutional commitment and social integration have a direct influence on persistence at residential colleges and universities. While, the other model suggests that institutional commitment and student entry characteristics have a direct influence on persistence at commuter colleges and universities.

All of the aforementioned retention theories were developed to guide research and to facilitate our understanding of the complex nature of student persistence and retention. However, another family of models is proposed to address how different groups of people interact within their respective environments.

### **College Student Typologies**

Psychosocial typology theories provide a framework to describe how individuals interact with their environments by defining groups of people based their holding common attitudes and exhibiting common behaviors. Rodgers (1989) suggests that types can be thought of as “[a] ‘zip code’ area within which we grow and develop” (p.153). He described several features common to typology models: (a) characteristics used to differentiate types develop at a young age and remain relatively stable over time; (b) individuals have a dominant type; (c) a type describes only the shared preferences within a group of individuals; however, each member of the group has distinctive characteristics

as well. According to Stage (1988), psycho-social typologies are a useful tool for organizing research to examine differences in outcomes for subpopulations of students created via the use of these typologies. While, Pascarella and Terenzini (2005) recommend that typology models can be “useful in understanding differences between college students and in illuminating why students may respond in different ways to the same college setting or experience” (p. 46). As shown in Table 2, several college student typologies based on personality, attitudes toward education, values, and experiences have been developed to understand college student populations. Luo and Jaimeson-Drake (2005) suggested that these student typology theories could be categorized into three groups (a) student-environment fit, (b) historical perspective, or (c) student attitudes/behaviors.

#### *Student-Environmental Fit Typologies*

Three college student typologies based on the level of congruence or “fit” between student characteristics and institutional norms were those typologies developed by Clark and Trow (1966), Newcomb, Koenig, Flacks, and Warwick (1967), and Katchadourian and Boli (1985).

Clark and Trow (1966) developed a four-category typology of student “educational philosophies” based on student attitudes at the University of California, Berkley. Student types were determined by how much or how little a student was involved with ideas and how much or how little identified with the institution.



**Table 2**  
**Major Student Typologies Published Since 1960**

Clark & Trow (1966)	Newcomb, Koenig, Flacks, & Warwick (1967)	Keniston (1973)	Tabor & Hackman (1976;1979)	Katchadourian & Boli (1985)	Horowitz (1987)	Astin (1993)	Kuh, Hu,& Vesper (2000)
Academic	Scholars	Professionalist	Scholar	Intellectual Striver	Outsider	Scholar	Intellectual Grind Scientist
Collegiate	Social group Leaders	Big man on campus Gentleman-in - waiting	Leader Athlete Socializer		College man	Leader Hedonist	Collegiate Socializer Conventional
Vocational		Apprentice Underachiever	Careerist Unqualified	Careerist	New outsider	Status- striver	
Non-Conformist	Creative individualists Wild ones Political activists	Activist Disaffiliate	Artist Alienated Directionless Disliked	Unconnected	Rebel	Social activist Artist Uncommitted	Artist Individualist Disengaged Recreator

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The four types they described were (a) *Academic* students are highly involved in ideas and strongly identify with the institution and therefore primarily focused on intellectual pursuits; (b) *Collegiate* students are less involved in ideas, but have a high affinity for the institution with a strong interest in the social aspects of the college experience; (c) *Nonconformist* students are characterized as highly involved in ideas and identify less with the institution, but are drawn toward the involvement with campus political life; and (d) *Vocational* students are less involved in ideas and weakly identify with the institution and therefore focus on the economic benefits of education. Subsequent research (Terenzini & Pascarella, 1977; Wilder, McKeegan, & Midkiff, 2000) determined that the

underlying constructs (involvement with ideas and identification with the institution) were valid and useful for differentiating students.

Newcomb, Koenig, Flacks, and Warwick (1967) developed a six-category typology at Bennington College based on environmental norms identified to exist among student populations at this institution. These researchers defined two types based on student behavior and the remaining four types were based on the dimensions- individualism and intellectualism. The six identified types were (a) the *Scholar* who displays high intellectuality/low individualism and focuses on academics exclusively; (b) the *Social group* who ranks low in both intellectuality and individualism tends to be drawn toward the social aspects of college; (c) *Creative Individualists*, rank high in both intellectuality and individualism, tend to hold firm beliefs in spite of societal pressure; (d) *Wild Ones* rank high in individualism and low in intellectuality tend to disregard academic pursuits in favor of hedonistic experiences; (e) *Leaders* participate in student government and are viewed as being popular with their peers; and (f) *Political Activists* are attracted to political and social concerns such as campus politics and civil rights. Two types that were primarily based on student involvement were *Leaders* and *Political Activists*.

Katchadourian and Boli (1985) in a longitudinal study of a cohort of Stanford undergraduates developed a four-category typology based on two scales: Intellectualism and Careerism. The scales had items that differentiated students based on their reasons for attending college, characteristics they

desired in a major, and characteristics they desired in a career. The four types they identified include: (a) *Intellectual* students, scored high on intellectualism and low on careerism scales, viewed college attendance as an opportunity to develop their intellect and discover new interests; (b) *Careerist* students, scored high on careerism and low on intellectualism, viewed college attendance as training for their chosen profession; (c) *Strivers*, scored high on both scales, viewed the education experience as valuable in itself, but also in its value in skill development for a future career; (d) *Unconnected* students, scored low on both scales, demonstrated a failure “to engage in their college education” (p182).

### *Historical Typologies*

Two prominent historical college student typologies were those developed by Keniston (1973) and Horowitz (1987) who described and defined the changes in the prevailing college student culture at different times in the history of American higher education.

Keniston (1973) developed a modern college student typology by describing seven student types through a historical perspective of higher education. Keniston considered four of the student types to be representative of the dominant student cultures found to exist at various time periods:

1. The *Gentleman-in-waiting*, this student type represented by beginnings of the American higher education system, where only affluent students could attend college. These students viewed higher

education as a “finishing school... [and as such] education was dispensable: since a gentleman is born not made” (p.324).

2. The *Apprentice*, this student type emerged at the beginning of the 19th century to the birth of the land grant universities, where higher education was viewed as a means of upward mobility toward prosperity and social status for poor and middle class students. These students strive and work hard in school because they view the acquired knowledge and skills as necessary to realize their dreams of future success.
3. The *Big Man on Campus*, this student type emerged at the beginning of the 20<sup>th</sup> century when the development of interpersonal skills became an important factor for future success in a more developed economic and strong government environment. These students viewed the campus as “a training ground for social skills” (p.325) through interactions with their peers rather than a place to develop their career skills or their intellectual ability.
4. The *Professionalist*, this student type emerged as 20th century society became more technologically advanced. These students viewed the campus as “a training ground for vocational skills, where ability, academic performance, and expertise were the measure of success.

According to Keniston, three other “deviant” student types appeared during the 20<sup>th</sup> century that were:

5. The *Activist*, this student type actively participated in campus demonstrations to advance changes in the institution or in society.
6. The *Disaffiliate*, this student type rejected the values of the campus and society, but “too pessimistic or too firmly against the ‘system’ to demonstrate” (p 338).
7. The *Underachiever* type set their standards for success so high that anything less than perfection led to a sense of failure.

Like Keniston, Horowitz (1987) developed a student typology from a historical perspective. Based on prevailing undergraduate cultures, she identified four major types: (a) *College Men*, represented the undergraduate culture of the 19th century, were from affluent backgrounds and valued peers over faculty and academics; (b) *Outsiders*, also part of the 19<sup>th</sup> century undergraduate culture, were often from less affluent backgrounds, valued hard work, academics and developing close ties with the faculty; (c) *Rebels* emerged in the early twentieth century, were often middle class students who fought against the university culture; and (d) *New Outsiders* emerged in the 1970s, valued the economic benefits of a college education and getting a competitive advantage over peers through higher grades and other achievements.

#### *Student Attitude/Behavior Typologies*

There are three college student typologies that were based on student attitudes or behaviors, namely: Hackman and Taber (1979; 1976); Kuh, Hu, and Vesper (2000); and Astin (1993b). Two Yale University institutional researchers

developed a college student typology with 12 student categories that they classified into either *successful* or *unsuccessful* patterns of student performance across a wide range of skills, attitudes, and behaviors (Hackman & Taber, 1979; Taber & Hackman, 1976). These researchers used structured interviews of university students, faculty, and staff to determine behaviors and characteristics that ultimately defined nine categories of student performance. The researchers asked respondents to identify the two *most successful* and the two *least successful* students and rate each one across 21 dimensions of student performance using the *College Criteria Questionnaire* (CCQ), a rating scale instrument developed from the analysis of structured interviews. Examples of the items that comprise the CCQ are intellectual growth, communication, academic effort, self-directed behavior, ethical behavior, participation in organizations, etc. The analysis of the CCQ responses revealed seven *successful* types that include:

1. *Leaders* who ranked high across all categories, however, this group ranked highest in terms of participation and balancing academic and social aspect of college life.
2. *Scholars* who ranked highest in intellectual performance and growth, and personal growth as well.
3. *Careerists* who demonstrated a high level of academic effort and performance and set career goals, however, this group did not rank high with respect to intellectual growth.

4. *Grinds* who demonstrated a level of high effort and focused this effort toward academic achievement, but ranked low in interpersonal skill development.
5. *Artists* who were ranked high in artistic performance and interest, but ranked lowest in terms of intellectual and personal development.
6. *Athletes* who ranked high in athletic performance and low in most academic dimensions, but exhibited the least amount of fit with the university amongst the success types.
7. *Socializers* who ranked high on interpersonal skills and low on academic dimensions, but was the lowest ranked success type in terms of self-directed behavior.

Of the *successful* types, *Leaders*, *Scholars*, and *Careerists* were viewed as most congruent with the college; namely these students exhibited high levels of scholarship, personal growth, interpersonal skills and self-directed behavior, which are attributes valued in the college context. The five *unsuccessful* types and those considered to be least congruent with the college identified by these researchers were:

1. *Disliked* students who ranked low in all interpersonal dimensions including ethical behavior and personal growth.
2. *Extreme Grinds* who demonstrated a lack of balance between the academic and social dimensions of college life, by focusing most if not all of their effort on academics.

3. *Alienated* students who ranked high in artistic performance, intellectuality, and communication, but demonstrated low self-direction and satisfaction with their college experience.
4. *Unqualified* students who ranked the lowest in terms of cognitive ability and generally earned low grades.
5. *Directionless* students who demonstrated the lowest academic effort and a preference for social rather than academic experiences.

Kuh, Hu, and Vesper (2000) described a college student typology based on 51,155 student responses to 128 items on the College Student Experiences Questionnaire (CSEQ) that related to the amount of time and energy the student respondent spent pursuing various activities such as academics, participating in campus life, interacting with peers and faculty. Their typology included 10 student types:

1. *Disengaged* students spent less time studying and reported lower grades than other types.
2. *Recreator* students tended to engage in sports and exercise and be pursuing an applied discipline.
3. *Socializer* students spent time with peers, but not necessarily through cocurricular activities.
4. *Collegiate* students were highly engaged in co-curricular activities, other than cultural and performing arts and tended to interact with both peers and faculty.



5. *Scientist* students tended to have a high amount of faculty interaction and pursue science and math disciplines.
6. *Individualist* group spent time with peers, but very little time with faculty and tended to participate in artistic activities.
7. *Artists* spent time pursuing artistic activities and had a high amount of faculty contact.
8. *Grind* students focused on academics to the exclusion of most other activities.
9. *Intellectuals* spread their time across multiple activities and tended to pursue majors in the humanities.
10. *Conventional* students tended to be involved in sports and exercise, social interactions, and pursue health-related or biological science disciplines.

Astin (1993b) described a college student typology based on student “values, attitudes, beliefs, self-concept, and behaviors.” This typology was based on an analysis of 10,000 student responses to the *Cooperative Institutional Research Program (CIRP) Freshman Survey*. In developing the typology, Astin identified and described seven personality types:

1. *Artists* are students who rate themselves as having high artistic ability and having a goal to “become accomplished in one of the performing arts” (p.39).

2. *Hedonists* are students who are more likely to drink beer, smoke, and have stayed up all night, and support the legalization of marijuana.
3. *Leaders* are students who tend to view themselves as being socially self-confident, popular, good at public speaking, and possessing leadership ability.
4. *Scholars* are students with “high expectations for academic success” (p. 38) and an intent to pursue graduate education.
5. *Social Activists* are students who tend to be involved with social activities to help others or to influence political structures.
6. *Status Strivers* are students who are interested in “money, power, and status” (p. 40) and aspire to be successful in entrepreneurship, supervision, and being recognized for their contributions.
7. *Uncommitted* students are defined by their pre-college expectations of changing their major or career path, stopping, transferring out, or dropping out of the institution before graduating.

Each of the major college student typologies was developed through different research approaches: a historical view (Horowitz, 1987; Keniston, 1973), investigation of student-college fit (Clark & Trow, 1966; Horowitz, 1987; Katchadourian & Boli, 1985; Keniston, 1973; Newcomb, Koenig, Flacks, & Warwick, 1967), or empirical studies of attitudes, performance, or activities (Astin, 1993b; Hackman & Taber, 1979; Kuh, Hu, & Vesper, 2000; Taber & Hackman, 1976). As the previous discussion has shown, college student

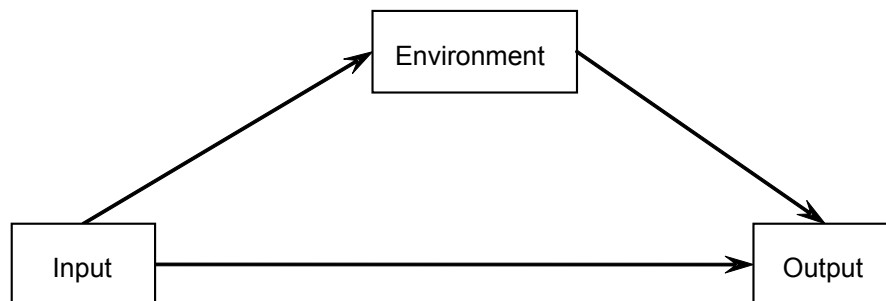
retention theories and various typologies have been proven useful for the study of college student populations. In addition, conceptual framework models have proven to be useful tools for the organization of such studies-- one in particular was the *Input-Environment-Output Model* developed by Alexander Astin.

### **Astin's Input-Environment-Output Model**

The input-environment-outcome (I-E-O) model was advanced by Astin (1975b, 1993a) as an approach to studying student populations and provides the conceptual underpinnings for this study of student retention. Although not explicitly stated, all of the theories mentioned in the previous sections can be thought of in the I-E-O framework. Astin notes that “outputs must always be evaluated in terms of inputs” (1993a, p. 17), noting that environmental factors such as interactions with peers, faculty, courses, and programs also significantly influence the student experience.

Astin (1993a) defined *inputs* as the personal characteristics that a student brings to their college experience, while the *environment* is defined by that which a student actually experiences once enrolled. Perhaps the best way to conceptualize the environment is that it consists of those aspects of the student experience for which an institution has some measure of control; for example, programs, policies, and educational experiences. *Outputs* represent a wide range of institutional measures such as retention rates, graduation rates, etc. As shown in Figure 1, the elements of the I-E-O model are interrelated with outcomes being directly influenced by both inputs and environmental variables.

Astin suggested that because inputs are related to both environment and outcome variables, inputs can affect the relationship between the environment and the outcome. Therefore, it is important to account for the differences that input variables may produce; namely, the confounding effect on the phenomenon being studied. Within the context of this study, the outcome variable is defined as retention from the first-to-second college year. The following sections of the literature review are organized and presented using the I-E-O framework. It is important to note that although the study variables are presented and discussed as discrete elements, these variables are actually related.



**Figure 1. The Input-Environment-Output Framework**

Source: *Assessment for excellence the philosophy and practice of assessment and evaluation in higher education* by A.W. Astin (1993)

### Input Variables

The seven input variables included in this study are *Astin Type*, *gender*, *ethnicity*, *first-generation status*, *financial need*, *SAT scores*, and *rank in high school class*.

### *Astin Type*

Since its development, the use of Astin's typology in research has been limited; however, recent research has reaffirmed its validity as a means to enhance our understanding of college student populations. Gilmartin and Sax (2002) used the Astin Typology in a multi-institutional logistic regression study of retention between the first and second college year. For this study, these researchers used three surveys: a) *Cooperative Institutional Research Program (CIRP) Freshman Survey* responses, b) *CIRP: Your First Year in College* survey responses, and c) a Registrar survey that provided respondent reenrollment information for the sophomore year. The sample consisted of 3,106 first-year students enrolled at 43 institutions. The regression model revealed that an inverse relationship existed among retention and three Astin types (Leader, Status Strivers, and Scholar. Additionally, these researchers found different predictors of retention by Astin type. First, Leader and Hedonist students who attend institutions closer to home were less likely to be retained. Second, a peer environment that supports activism has a positive effect on students classified as Leaders, but a negative effect on students classified as Social Activists. However, Gilmartin and Sax point out that a lack of prior research has severely limited the ability to interpret the meaning behind these differences.

Miller (2004) analyzed differences in degree completion by Astin type at a public master's level, a public research extensive, and a private liberal arts

university. The sample consisted of 7,365 student records of which 4,588 were degree completers with the remaining 2,777 designated as dropouts. In addition to the Astin types, several other factors (gender, minority/non-minority, parental income level, and high school grade point average) were included in this study to examine differences in degree completion. The analysis revealed:

1. Gender differences in degree completion for two of the Astin types; where male *Scholars* were more likely to graduate than their female peers were; however, the opposite pattern existed for *Status Strivers*.
2. Ethnicity differences in degree completion for two of the Astin types; where non-minority *Leaders* and *Status Strivers* were more likely to graduate than their minority peers.
3. Parental income level was found to be significant to degree completion; where high income was positively related to degree completion in all but two Astin types- *Artists* and the *Uncommitted* students.
4. High school grade point average was related to degree completion for all Astin types, with the exception of the *Hedonist* students, where no relationship was found.

Luo and Jaimeson-Drake (2005) conducted a multi-institutional study that examined the relationship between Astin type, academic performance, and skill development and various college outcomes such as leadership and science comprehension. The sample consisted of 23,893 student responses from 15

highly selective private institutions. These researchers found differences in academic performance to exist among Astin types with Success Strivers, Artists, and Scholars earning higher grades than their Hedonist peers; however, Hedonist students were found to be more satisfied with their college experience than other Astin types, particularly with social science courses, academic advising, and personal counseling services.

### *Gender*

Over the past 40 years, there has been a shift in the college going population, where women accounted for 42% of all undergraduates in 1970 has increased to 56% of all undergraduates in 2006 (National Center for Education Statistics [NCES], 2007). A similar enrollment pattern exists in Texas where women accounted for 55% of the enrollment at four-year public institutions (Texas Higher Education Coordinating Board [THECB], 2007a).

The study of the relationship between gender and student attrition has often resulted in mixed results. In some instances, research studies have demonstrated differences in attrition between genders. According to Astin (1975a), men are more likely to leave for academic reasons, while women are more likely to withdraw for personal reasons. Pascarella, Smart, and Ethington (1986) in a study based on Tinto's model that included 10,236 students enrolled at 487 colleges and universities. Through a regression analysis, they found that the level of institutional commitment/satisfaction had a direct influence on the persistence of men and that socioeconomic status had a direct effect on the

persistence of women. Leppel (2002) studied the factors that influence the persistence of men and women using 5,384 student records from the 1990 Beginning Postsecondary Survey (BPS).

The BPS administered by the National Center for Educational Statistics (NCES) is designed to follow a group of students longitudinally from their initial entry into higher education. The study revealed that both differences and similarities exist in the factors that influence the persistence of men and women. Being a parent had a negative impact on the persistence of men, but a positive impact on the persistence of women. In addition, this study uncovered that age, marital status, and hours worked had a negative impact on the persistence of both men and women, while higher family income, GPA, and integration into college had a positive impact on persistence of men and women. Conversely, in single institution studies these differences have not been observed. For example, McGrath and Braunstein (1997) found no significant differences to exist in retention rates based on gender in a logistic regression study of 322 freshmen at a private university in the Northeast.

### *Ethnicity*

The increasing numbers of minority students participating in higher education over the past 30 years represents a second shift in the college student population. In 2004, minority students comprised 30.4% of the national college student population, compared to only 14.5% in 1976 (National Center for Education Statistics [NCES], 2006). A similar pattern has begun to emerge in



Texas, where minority student enrollment has increased from 35.1% in 2000 to 40.8% in 2006 (Texas Higher Education Coordinating Board [THECB], 2007a).

The study of ethnicity and its impact on student attrition has produced mixed results. In a study of African-American and White students, Astin (1975a) found in no significant differences in retention after controlling for test scores and high school grades; however Hispanic student retention remained lower than their peers. Eimers and Pike (1997) found no differences in intention to persist between minority and non-minority students in a study of 799 first year students at a public university in the Midwest.

Murtaugh, Burns, and Schuster (1999) used survival analysis to develop a retention model based on 8,867 undergraduates who attended a public university over a five-year period. They found that African American, Hispanic, American Indian, and Pacific Islander students were less likely to persist than White students. However, these differences in persistence among ethnic groups were not observed, when other variables such as age, major, high school GPA and participation in orientation courses were added to the model. Allen (1999) demonstrated that different factors influence the retention of students from different ethnic backgrounds at a public institution using structural equation modeling techniques. Allen found that high school rank and first-year GPA were predictive of retention for both minority and non-minority students; however, a self-reported variable (desire to finish college) was a significant positive predictor for minority students but not non-minority students. In addition, non-minority

student retention was significantly influenced by parental education. Perhaps, it is the range of these findings that led Reason (2003a) to conclude and recommend that future retention studies should be “sophisticated enough to examine the interaction between race [ethnicity] with other variables” ( p.183).

### *First-generation Status*

An increasing number of first-generation students entering higher education institutions represents a third major shift in the college student population of the recent past. Several researchers have found that parents' education level affects college student attrition. Choy (2001) studied the National Education Longitudinal Study (NELS) data that followed a cohort of 1988 eighth graders through 2000 and the Beginning Postsecondary Student longitudinal Study (BPS) data that included all students who enrolled in postsecondary education for the first time in 1989-90 or 1995-96. Choy reported that 47% of all first-time post secondary students were first-generation students whose parents did not attend college. In particular, Choy found that at four-year institutions, first-generation students were twice as likely as peers whose parents had a bachelor's degree to leave before the second year. First-generation students are more likely to be older, women, Hispanic or African American, have dependents, and attend college part-time (Horn, Nevill, & Griffith, 2006; Nunez & Cuccaro-Alamin, 1998). According to Terenzini, Springer, Yaeger, Pascarella, and Nora (1996), first-generation students have a more difficult transition into higher education institutions compared to their peers whose parents graduated college.

A number of researchers have identified several variables that have been found to impact first-generation students; namely, lack of adequate information about (a) the cost to attend, (b) the application process, (c) the college experience and often have less academic preparation (Pascarella, Pierson, Wolniak, & Terenzini, 2004b; Thayer, 2000).

Ishitani (2003) in a longitudinal national study of 4,427 students found that first-generation students had a higher risk of leaving college before graduation compared to students whose parents had a college degree. Specifically, Ishitani found that first generation students were 1.3 times more likely to withdraw than second-generation students. Lohfink and Paulsen (2005) provided evidence that first-to-second year persistence of first-generation students and continuing-generation students are influenced by different factors though a national study that included 4,184 first-year students. Particularly, first-generation student retention was negatively impacted by being married, female or Hispanic, while being positively impacted by living at home. In a subsequent study, Ishitani (2006) reports that first-generation students take longer to complete their degrees. Pascarella, Pierson, Wolniak, & Terenzini (2004b) found that first-generation students tend to work more hours while in college than their peers, which has a negative impact on their development and progression toward degree completion. The increased number of hours first-generation students work may be related to the financial resources students have to fund their

education. Choy (2001) shows that 42% of dependent first-generation students have an annual family income that is less than \$25,000.

### *Financial Need*

Several researchers have documented the relationship between student finances (income levels) and attrition (Astin, 1975a, 2001; Braunstein, McGrath, & Pescatrice, 2000; Cabrera, Nora, & Castaneda, 1992; Choy, 2000; Pascarella & Chapman, 1983; St John, 2000; St. John, Paulsen, & Carter, 2005; Wohlgemuth, Whalen, Sullivan, Nadig, Shelley, & Wang, 2006). These studies have consistently shown that students from lower socio-economic backgrounds have a higher risk of attrition. Astin (1975a) noted a direct correlation between family income and attrition, while Pascarella and Chapman (1983) found that socio-economic status had an indirect effect on persistence.

Cabrera, Stampen, and Hansen (1990) focused on the financial resources that students and their family have to support post secondary education. They found a correlation between socio-economic status (SES) and persistence; lower SES indicated a stronger likelihood that a student would withdraw from the institution. Levine and Nidiffer (1996) found that students from families in the lowest income bracket were eight times less likely to graduate college than their peers from more affluent backgrounds. Similarly, Ishitani (2006) in a national study of 4,427 students found that low income first-generation students are approximately 2.3 times more likely to withdraw during their first year of college than higher income students. Based on sample of 1,111

drawn from a nationally representative sample of 28,000 high school seniors, Stage (1993) found parental income to be the third most useful predictor of persistence, after parental education level and high school GPA.

### *SAT Scores and High School Rank*

Several researchers have found that a strong relationship exists between previous educational achievement and student attrition (Allen, 1999; Astin, 1997; Elkins, Braxton, & James, 2000; McGrath & Braunstein, 1997; Wohlgemuth, Whalen, Sullivan, Nadig, Shelley, & Wang, 2006; Wolfe & Johnson, 1995). Astin (1975a) posited that previous academic achievement was the best predictor of student attrition.

The most common indicators of achievement included in retention research studies to represent these constructs are a) standardized test scores, such as SAT/ACT; and b) high school performance, such as rank or GPA. Astin (1997) found that high school grades, standardized test scores, gender, and ethnicity explain the majority of the variance in degree completion based on a study of 75,752 students at 365 institutions. Students with higher high school grade point averages were more likely to graduate in four, six, or nine years. A study of 844 students enrolled at a large urban university demonstrated that a combination of psychological factors with high school GPA and SAT score explained 36% of the variance in first year college GPA (Tross, Harper, Osher, & Kneidinger, 2000). Reason (2003b) demonstrated that ACT composite score and high school GPA were a significant predictors of retention in a logistic

regression study that included 38,789 students. Conversely, Lohfink and Paulsen (2005) and Ting (2003) found standardized test scores to be inadequate predictors of retention.

Ishitani (2006) showed that students with lower high school class rank were more likely to drop out of college than students with higher class ranks. Consequently, Schwartz and Washington (2002) suggested that high school rank is a better predictor of student success than standardized tests, since these tests “do not predict success consistently across gender and ethnic groups...[and] add little to prediction equations beyond high school grades or rank” (p. 356). These findings are supported by Hendel (2006), who found high school rank to be the sole predictor of retention in a logistic regression model. Although input variables have been found to be predictive of student attrition, environmental variables hold more promise for development of institutional policies and programs that influence student persistence and retention.

### **Environmental Variables**

The six environmental variables included in this study of college student retention are *first-semester residence, entry-college, semester credit hours attempted, academic course difficulty, and student participation in Supplemental Instruction, and/or participation in a first-year seminar course.*

#### ***First-semester Residence***

Nationally, approximately 28% of the 3.6 million undergraduate students attending four-year doctoral granting institutions live on-campus (Horn, Nevill, &

Griffith, 2006). Several researchers have studied the influence of place of residence has on retention, i.e. living on-campus v. living off-campus. Most of the evidence supports the premise that students that live on-campus are more likely to be retained (Astin, 1973; Astin, 2001; Chickering, 1974; Galicki & McEwen, 1989; Herndon, 1984; Lewallen, 1993; Thompson, Samiratedu, & Rafter, 1993). Other researchers have found that a lower risk of attrition may be related to other research findings that students who live on-campus are more involved in campus activities (Pascarella, 1985), demonstrate larger gains in critical thinking (Pascarella, Bohr, Nora, Zusman, Inman, & Desler, 1993), and earn higher grades (Kanoy & Bruhn, 1996; Nowack & Hanson, 1985).

Although there is a great deal of support for the benefits of living on-campus, other researchers have provided evidence to the contrary. In a national study that included 836 students, Anaya and Cole (2001) found that place of residence had no significant effect on the academic achievement of Latino/Latina students. Blimling (1999) through a meta analysis of 2000 articles related to the influence of on-campus residence found no significant differences between living on-campus or at home when controlling for initial academic performance.

### *Entry-College*

Much of a student's experience within the broader university environment is governed by their choice of major that influences interactions with faculty and peers, as well as the type and difficulty of the courses taken. Horn, Nevill, and

Griffith (2006) report that the most commonly chosen majors are business (20%) and health (16%) for those undergraduates with a declared major. A student's choice of major has been investigated by several researchers, but the findings have been inconsistent.

Astin (2001) provided evidence that different majors had different effects on student retention. He found that students pursuing business, or social sciences had lower risk of attrition, while students pursuing engineering had higher risk of attrition. While, DesJardins, Kim, and Rzonca (2002) demonstrated that freshmen majoring in business or engineering were less likely to drop out. St. John, Hu, Simmons, Carter, and Weber (2004) demonstrated differences in first-to-second college year retention based on a student's major and race in a study that included 8,878 students enrolled at public institutions. They found that being undecided or majoring in social sciences had a negative impact on White student retention, while major had no influence on the retention of African American students. Conversely, Lewallen (1993) studied a national sample of CIRP data that included 18,461 students. This research revealed that students with an undecided major did not have a higher risk of attrition.

Leppel (2001) used the 1990 survey of Beginning Postsecondary Students (BPS) to study the impact of college major on persistence. This study reported that the retention of women was negatively impacted by majoring in business or being undecided, while women pursuing a health major were more likely to persist. For men, retention was positively influenced by majoring in



business, but negatively influenced by being undecided or pursuing an education major. Pascarella and Terenzini (2005) suggest that future research focus on the causes of these differences in attrition rates for subpopulations within different majors. Academic major represents a subculture of the institution into which a student makes a choice to enter; however, closely associated with choice of major is the concept of *academic intensity* or *academic load* that includes such factors as semester credit hours attempted and course difficulty.

*Semester Credit Hours Attempted and Academic Course Difficulty*

The number of semester hours earned, a function of the number of courses attempted and the number of courses completed per semester, are all important factors for determining retention and timely degree completion. Adelman (2006) suggests that students who complete less than 20 semester credit hours during in their first year in college are less likely to earn a bachelors degree. Horn, Nevill, and Griffith (2006) studied the 2003–04 National Postsecondary Student Aid Study (NPSAS:04) that collected information from a sample of about 80,000 undergraduates who were enrolled at any given time between July 1, 2003, and June 30, 2004. They found that first-generation, African American, and Hispanic students were more likely to attend college part-time, which placed these students at a higher risk for attrition. Several researchers have studied student course-taking patterns and its relationship to retention (Adelman, 2006; DesJardins, Kim, & Rzonca, 2002; Duby &

Schartman, 1997; Horn, Nevill, & Griffith, 2006; Szafran, 2001; Volkwein & Lorang, 1996).

DesJardins, Kim, and Rzonca (2002) studied 2,498 students enrolled at the University of Iowa. They found through logistic regression that the higher the number of semester hour credits students attempted, the lower their risks of attrition were realized. Other important variables in the final model were college major, and high school rank. For those students who do persist, other research has demonstrated that first-semester course taking patterns continue over subsequent semesters (Duby & Schartman, 1997) and a pattern of lighter semester credit hour loads over time is detrimental to timely degree completion (Volkwein & Lorang, 1996). Other research has demonstrated that difficulty of courses taken had a negative relationship on academic achievement (Bean & Bradley, 1986; Pike, 1991).

An interesting approach to the study of the academic environment was introduced by Szafran (2001) who studied the impact of first semester hours attempted in combination with the calculated course difficulty variable, which he termed “academic load” (p. 27). After controlling for academic ability, and other background characteristics, Szafran found that students who attempted more semester credit hours tended to earn higher grade point averages and were more likely to be retained. However, students who enrolled in more difficult courses with a higher percentage of ‘D’s and ‘F’s tended to earn lower GPAs and were less likely to be retained. The transition to college and the challenge of

increased academic expectations lead many students to seek assistance through participation in institutional programs and services designed to assist with the transition to higher education.

### *Supplemental Instruction*

Deanna Martin developed Supplemental Instruction (SI) to promote the academic performance and retention of students in difficult courses at the University of Missouri at Kansas City (Arendale, 1994). Since its inception in 1973, SI has been implemented at over 1000 institutions worldwide (Arendale, 2003). A national survey of first-year programs showed that 39% of four-year institutions offered SI in courses taken by freshmen (Barefoot, 2005). The SI model provides peer-facilitated out-of-class review sessions, open to all students taking a course, that incorporate collaborative learning activities designed to foster mastery the course content (Widmar, 1994). The uniqueness of the SI model is that it targets difficult courses, rather than targeting students who are considered to be at a higher risk of attrition based on their previous academic preparation or achievement such as tutoring and other academic support programs. Under the SI model, courses considered high-risk are those with large enrollments, and a high proportion (30% or more) of low grades and withdrawals (Arendale, 1994). A peer facilitator, called an SI Leader, is hired, and trained in collaborative learning and group facilitation techniques. As a model student, who has previously taken the course, the SI Leader attends the class and plans three 50-minute structured review sessions. During review

sessions, students have the opportunity to actively engage with other students and receive feedback regarding their understanding of course content (Arendale, 1998). Two reasons the SI program has been so widely adopted is its history of effectively meeting its stated goals and its cost-effectiveness. Congos (2001) illustrated that institutions could benefit financially by implement SI since the program costs are less than the tuition dollars gained from the resultant increases in retention.

The 30-year history of SI has been highlighted by numerous evaluative studies. One of the most significant studies was conducted by the U.S. Department of Education; they found that,

1. Students participating in SI within the targeted historically difficult courses earn higher mean final course grades than students who do not participate in SI regardless of ethnicity or prior academic achievement.
  2. Regardless of ethnicity and prior academic achievement, students participating in SI within targeted historically difficult courses succeed at a higher rate (withdraw at a lower rate and receive a lower percentage of D or F final course grades) than those who do not participate in SI.
  3. Students participating in SI persist at the institution (reenrolling and graduating) at higher rates than students who do not participate in SI.
- (Center for Supplemental Instruction, 1998)

In general, research findings have been consistent with these findings. However, much of the research has centered on the short-term outcome of the final grade received in the targeted course; an example of which is the national report of SI effectiveness submitted by the International Center for Supplemental Instruction (2003). This study was based on 61,868 students at 53 institutions and showed that participants earn significantly higher average final course grades than non-participants. Those students who attend SI earn on average nearly one-half a letter grade higher than their peers who do not attend the sessions. In addition, the findings supported the claim that students who attend SI are 5.1% less likely to withdraw compared to students who do not attend.

Research about the effects of SI and longer-term outcomes such as one-year retention or graduation rates has been limited. Most of the evidence that supports the claim that SI has a positive impact on retention has come from the University of Missouri- Kansas City, where SI participants are retained at a rate that is 12.9% points higher than non-participants (Center for Supplemental Instruction, 1998). Additionally, research by Ramirez (1997) demonstrated that under-prepared students, those students with low SAT scores and prior GPAs, who participated in SI were retained at a higher rate (70%) than non-participants with higher SAT scores and prior GPAs (63%%). In a more recent study, Ogden, Thompson, and Russell (2003) demonstrated that conditionally admitted students who participated in SI reenrolled at higher rates (88.3%) than regularly

admitted students who attended (74.4%) and regularly admitted students who did not attend (81.0%).

Although SI is based on student success related to classroom engagements, SI remains primarily an out-of-classroom activity. Tinto (1997) points out that the “the classroom is the crossroads where the social and academic meet” (p. 599). Therefore, the classroom environment provides a valuable means to assist students with making a successful transition into the university setting.

### *First-year Seminars*

Barefoot (2005) notes that freshman seminar courses represent the most widely implemented curricular approaches to support first-year students, where 80% of four-year institutions offer these types of courses. According to Hunter and Linder (2005), although colleges and universities have a long history of providing first-year students a non-credit orientation course, the growth in the number of for-credit first-year seminar courses has occurred since about 1980. They describe five categories of first-year seminar courses: (a) extended orientation courses with a focus on student transition into the university environment; (b) academic courses with uniform content; (c) academic courses based on different topics; (d) discipline-specific courses that provide serve as an introduction to a discipline or career field; and (e) basic study skills courses.

A 2006 survey of first-year seminar programs showed that 43.4% of the institutions that had evaluated the course’s effectiveness observed an increase

in retention (National Resource Center for The First-Year Experience and Students in Transition, 2006). According to a Pascarella and Terenzini (2005), in their recent review of first-year seminar course research, they found that “uniformly consistent evidence of positive and statistically significant advantages to students” (p.400) existed, however, a only a few studies controlled for input variables or other environmental variables.

Strumpf and Hunt (1993) randomly assigned students who had expressed an interest in attending first-year seminars into two groups: (a) students who were allowed to enroll and (b) students who were not allowed to enroll. The group who was enrolled in the course was retained at a rate 13% higher than the control group. Yockey and George (1998) in a study of one first-year seminar course paired with Supplemental Instruction found that participants earned significantly higher semester grade point averages, and significantly higher retention rates after two years than the students who were in the control group.

Sidle and McReynolds (1999) controlled for pre-entry characteristics such as ACT, high school rank, ethnicity, and gender in a study of the effects of participating in a first-year seminar. They found that students who enrolled in the first-year seminar course tended to have higher cumulative grade point averages, completed a higher proportion of attempted courses, and were more likely to enroll in college the following year, than those students who did not enroll in the first-year seminar course.

More recently, two research studies have found evidence that conflict with these findings. Hendel (2006) showed that although participation in a first-year seminar had a positive effect on student satisfaction, participation did not increase the probability of retention. Keup (2005-2006) matched and analyzed 19,995 student responses from the 2002 *CIRP: Freshman Survey* and the 2003 *Your First College Year* survey to study the effects of seminar courses. This study found that first-year seminar courses alone were not predictive of a student's intent to re-enroll. However, when the seminar course was part of a learning community, in which students registered for a uniform block of courses, the likelihood of the intent to re-enroll was increased by 52%. Overall, the evidence supports the existence of a positive relationship between first-year seminar courses and retention; however in more rigorous studies—the evidence has been at best mixed and at worse inconclusive.

### **Summary**

This review of the literature revealed that many of the questions associated with retention in higher education remain unanswered. As the undergraduate population becomes larger and more diverse, institutions need to be mindful of the needs of current and future students in order to promote their successful transition into the university environment as well as their continued enrollment. The literature has documented existing theories regarding student retention (Astin, 1984; Bean, 1980, 1982; Bean, 1983; Bean & Metzner, 1985; Spady, 1970; Tinto, 1975, 1987, 1993) that provide the foundation for present



and future research. In addition, the literature has shown the utility of typology theories to enhance the understanding of student preferences and behaviors (Astin, 1993b; Clark & Trow, 1966; Horowitz, 1987; Katchadourian & Boli, 1985; Keniston, 1973; Kuh, Hu, & Vesper, 2000; Newcomb, Koenig, Flacks, & Warwick, 1967; Taber & Hackman, 1976). Typologies provide a framework to communicate student differences to students, their families, and other educators such as advisors and student support personnel. Finally, institutions implement support programs such as first-year seminars and Supplemental Instruction to address problems associated with student attrition; yet as the literature has shown, research findings are generally positive, but remain inconclusive.

Tinto's *student integration model* was used for the purposes of this study. This model guided the factor selection and the development of a retention model for the University. However, other retention theories assisted in the determination of the factors as well. In particular, enrollment in a *first-year seminar* and participation in *Supplemental Instruction* were considered measures of student involvement based on Astin's *student involvement theory*.

### CHAPTER III

#### METHODOLOGY

The purpose of this ex post facto study was to explore first-to-second year retention (outcome) among college students using pre-entry (input) variables and post-entry (environmental) variables. Specifically, the study examined the efficacy of Astin's (1993b) student typology and other variables in predicting retention from the first-year to the second-year of college. The following research questions were addressed in this study:

1. To what extent do the pre-entry (input) factors (gender, ethnicity, first-generation status, financial need, SAT scores, rank in high school class, and Astin type derived from the *Cooperative Institutional Research Program (CIRP) Freshman Survey*) predict retention (outcome) of selected undergraduate students at the University of Texas at San Antonio?
2. To what extent do the Astin type (input) and post-entry (environmental) factors (first-semester residence, entry-college, semester credit hours attempted, academic course difficulty, enrollment in a first-year seminar course, and participation in Supplemental Instruction) predict retention (outcome) of selected undergraduate students at the University of Texas at San Antonio?
3. To what extent does the combination of pre-entry factors (inputs), post-entry factors (environmental) predict selected undergraduate student

retention (outcome) of freshmen at the University of Texas at San Antonio?

4. To what extent does the combination of pre-entry factors (inputs), post-entry factors (environmental) impact the retention of students identified as a particular Astin type at the University of Texas at San Antonio?

This chapter outlines the methodology used to address the purpose of this study and to answer the research questions. The chapter is organized into three sections: (a) population and sample (b) instrumentation, (c) statistical analysis and model development

### **Population and Sample**

The population for this study included students who were first-time-enrolled-in-college freshmen at the University of Texas at San Antonio for the Fall 2002, 2003, 2004 semesters; this population consisted of 10,025 students, where 52.8% were females and 47.2% were males. The ethnic composition of the population was 43.7% Hispanic, 41.7% White Non- Hispanic, 7.4% Asian or Pacific Islander, 6.6% Black Non-Hispanic, and, and 0.6% American Indian or Alaskan Native.

Sample size is an important aspect of any research study. Agresti (2002) suggests that sample size should consider the power needed to detect the effect being studied. According to Peng, So, Stage, and St. John (2002), there is little guidance with respect to sample size for logistic regression analysis. Thus, since this study employed Maximum Likelihood as the best approach to estimate

logistic regression coefficients and to calculate the best fit of a model, the following recommendations were followed to determine the adequacy of the final sample. Long (1997) recommends a minimum sample size of 100, while other researchers advise a minimum of 10 observations per predictor variable (Peduzzi, Concato, Kemper, Holford, & Feinstein, 1996). There are 13 predictors in this study; therefore, a sample size of at least 130 participants would satisfy the stated sample size recommendations from these experts in the field.

For this study, all of the available data was analyzed. This sampling approach was deemed appropriate since the target population is specific to freshmen at the University of Texas at San Antonio. The sample was comprised of first-time enrolled in college students who completed a *Cooperative Institutional Research Program (CIRP) Freshman Survey* during required orientation sessions the summer prior to their first semester of enrollment at UTSA. Students agreed to allow the University to use their responses for research purposes, and were enrolled in at least one course that was supported by Supplemental Instruction.

The sample for this study consisted of 1,298 student participants, where 55.3% were females and 44.7% were males. The ethnic composition of the sample was 46.1% Hispanic, 39.8% White Non-Hispanic, 7.2%, Black Non-Hispanic, 6.7% Asian or Pacific Islander, and 0.2% American Indian or Alaskan Native. Table 3 provides a comparison across several demographic variables between the sample and the population from which the sample was selected.

**Table 3**  
**Descriptive Data for Overall Population and Student Participants**

Demographic Variable	% of Population (N =10,025)	% of Student Participants (N = 1,298)
Gender		
Male	47.2	44.7
Female	52.8	55.3
Ethnicity		
Hispanic	43.7	46.1
White Non-Hispanic	41.7	39.8
Black Non-Hispanic	6.6	7.2
Asian or Pacific Islander	7.4	6.7
American Indian or Alaskan Native	0.6	0.2
Financial Aid Applicant	68.3	75.0
First Generation Status		
First Generation	48.5	48.8
Not First Generation	51.5	51.2
High School Rank		
In Quartiles		
Top Quartile	37.2	43.1
Second Quartile	36.1	35.1
Third Quartile	20.2	16.9
Bottom Quartile	6.5	4.9
Mean SAT Score	1002.6	1003.0
Std Dev.	144.2	131.3

### Instrumentation

This study utilized three existing databases. The first database was the CIRP Freshman Survey. These databases included all the student responses for each of the survey administrations for the time period chosen for this study. The second database consisted of institutional student data records from the

BANNER system. The BANNER system includes admission, academic, demographic, and personal information for each student enrolled at the University. The Office of Institutional Research managed these databases and extracted the data used for this study. The final database included participation data for the Supplemental Instruction program, maintained by the Tomás Rivera Center for Student Success (TRCSS). The TRCSS oversees the major academic success programs at the institution, which includes SI, tutoring, and first-year seminar courses.

*CIRP: Freshman Survey*

Since fall 1966, the Cooperative Institutional Research Program housed at Higher Education Research Institute (HERI) located at University of California, Los Angeles has collected survey data on the demographics; expectations of college; high school experiences; degree goals and career plans; college finances; attitudes, values, life goals; and reasons for attending college using the *CIRP: Freshman Survey* (Higher Education Research Institute, 2006). The survey is a standardized instrument organized in 40 sections and includes questions measuring student characteristics including demographics, academic interests, high school achievements, behaviors, career plans, values, attitudes, and self-concept. A copy of the instrument can be found in Appendix A.

This study used 51 items from six sections of the CIRP: Freshman Survey. Five sections and the associated items were used to assign participants to Astin typologies based on the stable nature of Astin types as demonstrated in

previous research (Astin, 1993b; Gilmartin & Sax, 2002; Luo & Jaimeson-Drake, 2005; Miller, 2004). These five sections included measures of behaviors, self-concept, attitudes, values, and expectations.

The behaviors section measured the frequency of the prior behaviors and activities that respondents that had engaged. The behaviors section included 11 items that asked respondents to indicate how often they engaged in various activities during the past year. For example, participants were asked if they *came late to class, drank beer, smoked cigarettes, or studied with other students*. These items were measured on a three-point scale: (a) frequently, (b) occasionally, and (c) not at all.

The self-concept section measured how each respondent compared their own abilities, skill, and traits to their peers. Self-concept items asked respondents to rate themselves on 11 personal traits as compared to the average person of their same age. For example, the traits related to *academic ability, artistic ability, and leadership ability*. Participants rated their abilities on a five-point scale including: (a) highest 10%, (b) above average, (c) average, (d) below average, and (e) lowest 10%.

The attitudes section measured the beliefs and attitudes embraced by the respondent. The attitudes section included four items that asked the respondents to indicate the degree to which they agreed with certain statements about various issues. For example, they were asked whether *marijuana should be legalized* and if *wealthy people pay a larger share of taxes than they do now*.

Participants responded on a four-point scale with choices ranging from agree strongly to disagree strongly.

The values section measured the future goals or achievements that the respondent held to be important. The values section included 13 items that asked participants to indicate, on a four-point scale, the importance of achieving a range of life goals. For example, the participants were asked how important it was *to become an authority in their field*, *to be very well off financially*, and *to develop a meaningful philosophy of life*. The four-point scale response choices included: essential, very important, somewhat important, and not important.

The expectations section measured the likelihood that respondents would participate in an activity or behavior in the future. The expectations section included 12 items related to future actions. Some of the actions included, for example, *changing major field*, *changing career choice*, and *participating in student clubs/groups*. Participants responded on a four-point scale ranging from very good chance to no chance as to whether they believed they might take one of the listed actions.

One additional item was used from the CIRP: Freshman Survey that asked participants to indicate where they planned to live during the fall term. The item (liveplan) asked participants to choose one of six response options that included: live with family, other private home or apartment, college dormitory, fraternity or sorority house, other campus student housing, or other. These data were recoded to create the first semester residence variable (reside), where



college dormitory, fraternity or sorority house, other campus student housing responses were coded (1= on-campus); while live with family, other private home or apartment, and other were coded (0= off-campus).

### *Calculation of Astin Types*

The principal components factor analyses procedure described by Gilmartin and Sax (2002) was used to calculate each participant's Astin Type. All factor analyses used varimax rotation techniques. A participant's score for a given factor was calculated based on their responses to the items that comprised that factor. The item scores were standardized and summed to compute each factor score for all participants. The reliability of each factor was calculated using Cronbach's alpha. A frequency distribution was used to determine the appropriate "cut-scores" required to assign a student to a specific Astin type. Astin types were subsequently coded as categorical variables, where students were classified as a particular type (e.g., Artist, Scholar, etc.) if their score on the respective factor score was in the top third of the frequency distribution for the factor. For example, for a student to be classified as an Artist type, their total factor score for the Artist type had to be greater than 66% of all other participant's scores for the Artist type. A list of items that contained in each Astin Type, the item factor loadings, and Cronbach's alpha values for each type is provided in Table 4.

**Table 4**  
**Items, Factor Loadings, and Reliability Coefficients by Astin Type**

Astin Type	Factor Loading	Cronbach's alpha
Artist		.62
Achieve in a Performing Art	.65	
Artistic Ability	.76	
Create Artistic Work	.79	
Hedonist		.67
Drank Beer	.81	
Marijuana Should be Legalized	.56	
Partying	.73	
Smoked Cigarettes	.73	
Leader		.74
Leadership Ability	.77	
Public Speaking Ability	.75	
Self-confidence (social)	.76	
Scholar		.63
Academic Ability	.77	
Make at Least a "B" Average	.57	
Mathematical Ability	.72	
Self-confidence (intellectual)	.49	
Social Activist		.73
Help Others in Difficulty	.56	
Influence Political Structure	.68	
Influence Social Values	.73	
Participate in Student Government	.56	
Take Part in Community Action Program	.68	
Status Striver		.70
Be Successful in Own Business	.67	
Be Very Well Off Financially	.76	
Become Authority in My Own Field	.51	
Have Administrative Responsibility	.56	
Obtain Recognition from Colleagues	.49	
Uncommitted		.65
Change Career Choice	.90	
Change Major Field	.91	

### *Student Demographic and Enrollment Records*

The second database employed in the study consisted of institutional student data records. This database was comprised of four sets of variables. The first variable was a student status variable (retain). This was a dichotomous variable and coded to identify *persistors*, students who returned for their second fall semester (code = 1) and *non-persistors*, students who do not return (code = 0).

The second set included four demographic variables: gender, ethnicity financial need, and first generation status. Gender was a dichotomous variable designed to classify females (code = 0) and males (code = 1). The sample included Hispanic, White non-Hispanic, Black non-Hispanic, Asian or Pacific Islander, and American Indian or Alaskan Native students. A decision was made to recode each of these groups into four categories to create the variable (ethnicity) using the following scheme White non-Hispanic (code = 0), Hispanic (code = 1), Black non-Hispanic (code = 2), and Asian or Pacific Islander, American Indian or Alaskan Native and International students (code = 3). The first-generation status variable was based on the student's admission record that indicates the highest level of education for each parent. The choices range from "No high school" to "Completed a graduate degree/professional degree." These data were recoded to create the first-generation variable (firstgen), where the selected parent's education level equal to a bachelors degree or higher (0 = not first generation) and less than a college degree (1= first-generation).

The financial need (finneed) variable was based on family income values from the UTSA Financial Aid Office records contained in the Banner system. These data were ranked and quartiles of family income were calculated for those student participants who applied for financial aid. The quartile data were recoded into the following family income categories for financial aid applicants: Low Income (code =1), Lower middle (code =2), Upper Middle (code = 3), and High Income (code = 4). Student participants who did not apply for financial aid were coded as non-aid applicants (code = 0).

The third set of variables included high school academic performance variables including rank in high school class (hsrank), and standardized test scores. The highest composite SAT and ACT score in Banner was used for the purposes of this study. ACT scores were converted to SAT scores so that the highest score could be identified for the variable (satcomp). A copy of the ACT to SAT conversion table is provided in Appendix B. The high school rank variable (hsrank) was based on each student's percentile rank in their graduating class as reported on the high school transcript used for admissions. These data were recoded into the following categories representing high school rank quartiles: first quartile (code =1), second quartile (code =2), third quartile (code =3), and the fourth quartile (code =4).

The fourth set of variables included environmental variables: entry-college, semester credit hours attempted, academic course difficulty, and enrollment in a first-year seminar course. Entry-College was a coded as

categorical variable (college) based on the student's admission application. College choices include: Business, Education, Liberal and Fine Arts, Sciences and Engineering, and Undecided. The Semester credit hours attempted variable (credithr) was based on a summary field in BANNER that calculates the total number of semester credit hours for which a student was enrolled on the tenth day of classes. Academic course difficulty is a factor based on the proportion of 'D' or 'F' grades earned in a particular course (Szafran, 2001). The academic course difficulty (acaddiff) variable was calculated based on the courses for which the student participant was enrolled during the first semester. Initially, all final grades were summarized for course sections in which at least one participant was enrolled by calculating the proportion of 'D' and 'F' grades for each section and multiplying that value by the number of student credit hours for each course. This product represents the academic course difficulty value for a given course. Then, each participant's academic course difficulty variable was computed by summing the calculated academic course difficulty values for all the course sections in which they were enrolled. Enrollment in a first-year seminar course was coded as a dichotomous variable (seminar) designed to classify participants enrolled in a first-year seminar course (code =1) and those participants not enrolled in a first-year seminar course (code =0) during their first fall semester.

### *Supplemental Instruction Database*

The third database employed in the study consisted of SI attendance data collected from the records of the Tomas Rivera Center for Student Success. These data are used to generate end of semester statistical reports to assess program effectiveness. These data were used to identify the SI attendance variable (sipart) based on the total number of SI sessions that each student participant attended during first semester. Participation in SI was coded to identify SI participation, one or more sessions attended (code = 1) and no SI participation (code= 0).

### **Statistical Analysis and Model Development**

The impact of SAT scores, rank in high school class, gender, ethnicity, first-generation status, financial need, Astin Type, first-semester residence, entry-college, academic load, participation in Supplemental Instruction, and participation in first-year seminar on retention of freshmen at the University of Texas at San Antonio was determined within the sample population through three multiple logistic regression models. In this type of regression model, a single binomial outcome (dependent) variable such as retention (0 = “non-persistor,” 1 = “persistor”) can be predicted using a combination continuous and categorical input or environmental (independent) variables (Agresti, 2002). The resultant model is one that predicts the probability that a participant will fall into one or the other categories i.e. *persistor* or non-persistor (George & Mallery, 2006). When researching a binary dependent variable like retention, logistic

regression is considered superior to other statistical methods (Peng, So, Stage, & St. John, 2002). This is based the ability of logistic regression to produce accurate classification results, while not having to meet the assumptions of normality or equal variance of residuals associated with other regression methods. However, logistic regression does have limitations, namely, a sensitivity to (a) multicollinearity, where two or more predictor variables are highly correlated with each other; and (b) outliers, where extreme values of predictor variables are present for one or more cases. To ensure that these assumptions were met, the data were screened before any of the logistic regression models for this study were developed. To address issues associated with multicollinearity, two approaches were used (a) an examination of the amount of correlation between pairs of predictor variables, and (b) an examination of the tolerance and variable inflation factor (VIF) statistics available in SPSS regression procedures (George & Mallery, 2006). To address issues of outliers, the predicted probability residuals were examined to identify cases that each model predicted poorly. A poorly predicted case is one that is actually in one category (e.g. Persistor) but the model predicts a high probability of being in the other category (e.g. Non-persistor). Within these misclassified cases those that exhibit large residuals, based difference between the expected probability and the actual outcome, are considered outliers. For this study, any cases with a residual greater than two standard deviations from the mean were considered

outliers for a particular model and were removed to improve model fit (Tabachnick & Fidell, 2007).

Following Astin's (1993a) Input-Environment-Outcome (I-E-O) model the independent variables were blocked based on each research question posed (Gilmartin & Sax, 2002). This research design parallels the entry and enrollment sequence of a student's transition into the university and supports a clear structure for the presentation of the findings. Separate multiple logistic regression analyses were performed to determine how well each block of independent variables predicted retention. Menard (2002) states that it is generally accepted practice to use stepwise procedures for purposes of exploratory research. These procedures allow the researcher to systematically evaluate the value of a specific variable to enhance predictive accuracy and to find the best model. Further, Menard (2002) recommends using backward elimination rather than forward addition procedures to reduce the risk of not finding a relationship when one exists.

In stepwise logistic regression, variables are entered or removed based on its statistical significance in predicting the variance in the dependent variable (Hosmer & Lemeshow, 2000). For this study specifically, the predictive value of each model was maximized by selecting the most important input and environmental variables, which were those variables that produced the greatest significant change in the odds of retention predicted by the regression model developed for each research question (Tabachnick & Fidell, 2007). The



likelihood ratio test was employed to determine the relative contributions of input and environmental variables in the best fitting and most parsimonious model predicting student retention (Hosmer & Lemeshow, 2000).

Argesti (2002) advises that the predictive accuracy of each model be evaluated through a classification table by comparing the predicted outcome against the actual outcome for each participant. In addition, the *odds ratio* associated with each predictive variable in each of the models is presented. According to Mertler and Vannatta (2005) the odds ratio “represents the increase or decrease in the odds of being classified in a category when the predictor variable increases by one”(p.318). Tabachnick and Fidell (2007) recommend presenting the results in odds ratio when the study is interested in the impact of the independent variables, controlling for the effects of other variables in the model.

### **Summary**

This study utilized SPSS version 15.0 in the analyses of the dataset of students selected from the student population at a single, large Hispanic Serving Institution. The impact of gender, ethnicity, first-generation status, SAT scores, rank in high school class, financial need, Astin Type, on the first-to-second year retention was determined within the sample population through three multiple logistic regression models. Logistic regression modeling was selected as the most appropriate statistical analysis technique for studying a dichotomous

dependent variable such as retention. The results of the analyses performed are presented in Chapter IV.

## CHAPTER IV

### RESULTS

The purpose of this ex post facto study was to identify how input and environmental factors impact first-to-second year retention of undergraduate students at a large Hispanic Serving Institution (HSI). An additional purpose of the study was to determine the usefulness of the Astin Typology as a predictive factor for student retention.

#### **Research Questions**

The following research questions were addressed in this study:

1. To what extent do the pre-entry (input) factors (gender, ethnicity, first-generation status, financial need, SAT scores, rank in high school class, and Astin type derived from the *Cooperative Institutional Research Program (CIRP) Freshman Survey*) predict retention (output) of selected undergraduate students at the University of Texas at San Antonio?
2. To what extent do Astin type (input) and post-entry (environmental) factors (first-semester residence, entry-college, semester credit hours attempted, academic course difficulty, participation in Supplemental Instruction, and enrollment in a first-year seminar course) impact retention (output) of selected undergraduate students at the University of Texas at San Antonio?
3. To what extent does the combination of pre-entry factors (inputs), post-entry factors (environmental) impact selected undergraduate student

retention (output) of freshmen at the University of Texas at San Antonio?

4. To what extent does the combination of pre-entry factors (inputs), post-entry factors (environmental) impact the retention of students identified as a particular Astin type at the University of Texas at San Antonio?

A sample that included all students ( $n = 1298$ ) who completed the *CIRP: Freshman Survey* at the University of Texas at San Antonio during the 2002, 2003, and 2004 academic years was used to address the research questions. Since *CIRP: Freshman Survey* data were not available for all first-year students who were admitted to the University, preliminary data analysis was performed to determine whether the available sample population was comparable to the overall first-year student population admitted to the University. A second purpose of the preliminary data analysis was to explore the characteristics of the Astin Types within the student participant sample population utilizing both descriptive and univariate statistics. This exploratory second-step assisted in interpreting the results depicted in the subsequent analyses that addressed each of the research questions.

### **Preliminary Data Analysis**

The first step in the preliminary data analysis process was to identify differences found to exist among the demographic factors included in this study between the students who completed the *CIRP: Freshman Survey*, identified as student participants and those first-year students who did not complete the survey, identified as non-completers. Differences between student participants

and non-completers were potentially an indication that the results of the study could not be generalized to the overall first-year student population. Therefore, the entire first-year student population was divided into two groups to conduct the preliminary data analysis: *Student participants* (n= 1,298) and *non-completers* (n= 8,727). Demographic and pre-entry academic (input) data were collected for all 10,025 first-year students. These input data included *gender*, *ethnicity*, *first-generation status*, *family income*, *rank in high school class*, and *SAT score*.

### *Gender*

The first demographic factor analyzed was gender. Chi-square analysis was used to test for significant differences between the survey groups based on gender. Table 5 shows the results of this analysis. The data analysis revealed no significant difference between the survey groups based on gender,  $X^2(1, n = 10025) = 3.793$ ,  $p = .051$ .

**Table 5**  
**Crosstabulation: Gender, by Survey Group**

	Group (n/% in Column)		Total
	Non-completers	Student Participants	
Female	4575/52.4	718/55.3	5293/52.8
Male	4152/47.6	580/44.7	4732/47.2
Total	8727/100.0	1298/100.0	10025/100.0

Note:  $X^2(1, n = 10025) = 3.793$ .  $p = .051$

### *Ethnicity*

The second demographic factor analyzed was ethnicity. It should be noted that although UTSA has a large minority student population (i.e. Hispanic students represent 42% of the total student population); few minority students at the University represent American Indian or Alaskan Native populations. Thus, due to the limited number of American Indian or Alaskan Native students represented in the first-year student population, a decision was made to eliminate American Indian or Alaskan Native students from the remaining analyses to ensure that expected cell frequencies met the recommended minimum number of five cases per cell (Ott & Longnecker, 2004). The exclusion of these student cohorts resulted in a final first-year student population of 9,966 students and a student participant sample of 1,296 students.

Chi-square analysis was used to test for significant differences between the groups based on ethnicity. The results of this analysis are shown in Table 6. The data analysis revealed no significant difference between the survey groups based on ethnicity,  $X^2 (3, n = 9966) = 5.19, p = .158$ .

**Table 6**  
**Crosstabulation: Ethnicity, by Survey Group**

	Group (n/% in Column)		Total
	Non-completers	Student Participants	
White Non-Hispanic	3663/42.2	517/39.3	4180/41.9
Black Non-Hispanic	567/6.5	94/7.3	661/6.6
Hispanic	3781/43.6	598/46.1	4379/43.9
Asian Pacific Islander	659/7.6	87/6.7	746/7.5
Total	8670/100.0	1296/100.0	9966/100.0

Note:  $X^2$  (3, n =9966) = 5.19. p = .158

### *First Generation Status*

The third demographic factor analyzed was first generation status. Chi-square analysis was used to test for significant differences between the survey groups based on first generation status. The results of this analysis are shown in Table 7. The data analysis revealed a significant difference between the survey groups based on first generation status,  $X^2$  (1, n = 9966) = 4.13. p = .042. Specifically, the student participant sample had a higher proportion of first generation students than the non-completer group. Based on the differences found between these groups, results from this particular analysis were considered during the interpretation of results of the subsequent logistic regression models.

**Table 7****Crosstabulation: First Generation Status, by Survey Group**

	Group (n/% in Column)		Total
	Non-completers	Student Participants	
Not First Generation	4497/51.9	633/48.8	
First-Generation	4173/48.1	663/51.2	
Total	8670/100.0	1296/100.0	9966/100.0

Note:  $X^2(1, n = 9966) = 4.13$ .  $p = .042$

### *Family Income*

The next demographic factor analyzed was family income. These data were based on institutional financial aid records. An independent  $t$  test was used to test for differences in the mean family income of the student participants and non-completers. The results of this analysis revealed no significant difference between the two survey groups,  $t(6,894) = 1.045$ ,  $p = .296$ . Non-completers had a mean family income of \$59,580.85 and student participants had a mean family income of \$57,874.51.

### *SAT Scores*

The next factor analyzed was SAT score. An independent  $t$  test was used to test for differences in the mean SAT scores of the student participants and non-completers. The results of this analysis revealed no significant difference between the two survey groups,  $t(1,890.5) = .151$ ,  $p = .880$ . Non-completers had a mean SAT score of 1002.4 and student participants had a mean SAT score of 1003.0.



### *Rank in High School Class*

The final demographic factor analyzed was rank in high school graduating class. Chi-square analysis was used to test for significant differences based on rank in high school class. The results of this analysis are shown in Table 8.

**Table 8**

**Crosstabulation: High School Class Rank, by Survey Group**

	Group (n/% in Column)		Total
	Non-completers	Student Participants	
Top Quartile	3156/36.4	559/43.1	3715/37.3
Second Quartile	3140/36.2	456/35.2	3596/36.1
Third Quartile	1790/20.6	218/16.8	2008/20.1
Bottom Quartile	584/6.7	63/4.9	647/6.5
Total	8670/100.0	1296/100.0	9966/100.0

Note:  $X^2 (3, n = 9966) = 28.33$ .  $p < .001$

The data analysis revealed a significant difference between the survey groups based on rank in high school class,  $X^2 (3, n = 9966) = 28.328$ ,  $p < .001$ . Specifically, the student participant sample had a higher proportion of students in the top quartile of their high school graduating class than the non-completer peers. Also, the student participant sample had a lower proportion of students in the third and bottom quartiles of their high school graduating class than the non-completer group. Therefore, these differences were subsequently considered during the interpretation of results for logistic regression analyses that included rank in high school class as a predictive factor.

### Descriptive and Univariate Statistics for Astin Types

The second purpose of the preliminary data analysis was to explore the characteristics among and between Astin types in input and environment factors. Frequencies of each Astin type are displayed in Table 9.

**Table 9**  
**Astin Type Frequencies (N= 1,296)**

	f	Percent
Artist	167	12.9
Hedonist	213	16.4
Leader	178	13.7
Scholar	132	10.2
Social Activist	227	17.5
Status Striver	200	15.4
Uncommitted	179	13.8

The sample population included students who depicted each Astin type: Artist, Hedonist, Leader, Scholar, Social Activist, Status Striver, and Uncommitted. The most frequent Astin type observed was *Social Activist* that represented 17.5% of the sample population. The least frequent Astin type observed was *Scholar* that represented 10.2% of the sample population. In the next section, univariate analyses of the differences among Astin types are presented following the structure of Astin's I-E-O model.

### Input Factors

#### Gender

Chi-square test of independence was used to test whether a significant relationship existed between Astin type and gender. Table 10 shows the results of this analysis.

**Table 10**  
**Crosstabulation: Astin Type, by Gender**

	Gender (n/% in Row)		Total
	Female	Male	
Artist	97/58.1	70/41.9	167/100.0
Hedonist	106/49.8	107/50.2	213/100.0
Leader	99/55.6	79/44.4	178/100.0
Scholar	54/40.9	78/59.1	132/100.0
Social Activist	156/68.7	71/31.3	227/100.0
Status Striver	101/50.5	99/49.5	200/100.0
Uncommitted	103/57.5	76/42.5	179/100.0
Total/Overall	716/55.2	580/44.8	1296/100.0

Note:  $X^2$  (6, N = 1296) = 32.99.  $p < .001$

The results of the data analysis revealed that ethnicity and Astin type were not independent,  $X^2$  (6, N = 1296) = 32.99,  $p < .001$ . The data analysis revealed that gender and Astin type were not independent,  $X^2$  (6, N = 1296) = 32.99,  $p < .001$ . Male students were more likely to be classified as a *Hedonist* or *Scholar*. Female students were more likely to be classified as a *Social Activist* and less likely to be classified as a *Scholar*. The remaining Astin types were

more reflective of an equal distribution among males and female student participants.

### Ethnicity

Chi-square test of independence was used to test whether a significant relationship existed between Astin type and ethnicity. Table 11 depicts the results of this analysis.

**Table 11**  
**Crosstabulation: Astin Type, by Ethnicity**

	Ethnicity (n/% in Row)				Total
	Hispanic	White Non-Hispanic	Black Non-Hispanic	Asian or Pacific Islander	
Artist	79/47.3	70/41.9	12/7.2	6/3.6	167/100.0
Hedonist	78/36.6	119/55.9	7/3.3	9/4.2	213/100.0
Leader	94/52.8	63/35.4	9/5.1	12/6.7	178/100.0
Scholar	65/49.2	46/34.8	10/7.6	11/8.3	132/100.0
Social Activist	116/51.1	72/31.7	25/11.0	14/6.2	227/100.0
Status Striver	99/49.5	63/31.5	19/9.5	19/9.5	200/100.0
Uncommitted	67/37.4	84/46.9	12/6.7	16/8.9	179/100.0
Total/Overall	598/46.1	517/39.9	94/7.3	87/6.7	1296/100.0

Note:  $X^2$  (18, N = 1296) = 56.32.  $p < .001$ .

The results of the data analysis revealed that ethnicity and Astin type were not independent,  $X^2$  (18, N = 1296) = 56.32,  $p < .001$ . Hispanic students were more likely to be classified as *Leader*, *Social Activist*, or *Status Striver*. White non-Hispanic students were more likely to be classified as *Hedonist* or *Uncommitted* and less likely to be classified as *Social Activist* or *Status Striver*.

Black non-Hispanic students were more likely to be classified as *Social Activist* or *Status Striver* and less likely to be classified as *Hedonist*. Asian or Pacific Islander students were more likely to be classified as *Status Striver* or *Uncommitted*.

### First Generation Status

Chi-square test of independence was used to test whether a significant relationship existed between Astin Type and first generation status. Table 12 shows the results of this analysis.

**Table 12**

**Crosstabulation: Astin Type, by First Generation Status**

	First Generation Status (n/% in Row)		Total
	First-Generation	Not First Generation	
Artist	88/52.7	79/47.3	167/100.0
Hedonist	96/45.1	117/54.9	213/100.0
Leader	101/56.7	77/43.3	178/100.0
Scholar	72/54.5	60/45.5	132/100.0
Social Activist	132/58.1	95/41.9	227/100.0
Status Striver	105/52.5	95/47.5	200/100.0
Uncommitted	69/38.5	110/61.5	179/100.0
Total/Overall	663/51.2	633/48.8	1296/100.0

Note:  $\chi^2$  (6, N = 1296) = 22.12. p = .001.

The results of the data analysis revealed that first generation status and Astin type were not independent,  $\chi^2$  (6, N = 1296) = 22.12, p = .001). First generation students were more likely to be classified as *Social Activist* or

*Leader*. Students who were not first generation were more likely to be classified as *Hedonist* or *Uncommitted*.

### Financial Need

The next input factor analyzed was financial need based on family income. These data were based on institutional financial aid records. Family income was recoded into quartiles for financial aid applicants (N = 1296) and students without income data (N= 324) were coded as 'non-aid' applicants' in order to control for various levels of financial need (St John, 2000). In addition, this strategy permitted the comparison of students who had a perceived financial need and applied for financial aid with those students who did not apply for financial aid. Quartile ranges for family income are shown in Table 13.

**Table 13**  
**Descriptives: Financial Need Category**

	N	Minimum	Maximum	Mean	Std. Deviation
Low Income	244	\$0.00	\$27,547.00	\$16,858.02	7652.680
Lower Middle	238	\$27,550.00	\$48,341.00	\$37,094.27	5925.166
Upper Middle	255	\$48,359.00	\$80,643.00	\$63,172.55	9306.540
High Income	235	\$80,678.00	\$780,074.00	\$120,236.5145	51933.309

Chi-square test of independence was used to test whether a significant relationship existed between Astin Type and financial need. Table 14 shows the results of this analysis. The results of the data analysis revealed that financial

need and Astin type were not independent,  $X^2$  (24, N = 1296) = 38.72,  $p = .029$ . Low income students tended to be classified as *Social Activist* or *Status Striver*. Students in the lower middle family income category were more likely to be classified as *Scholar*. Upper middle income students tended to be classified as *Artist* or *Social Activist*. Students in the high family income group were more likely to be classified as *Scholar* or *Uncommitted*. Students who did not apply for financial aid (non-aid applicant) tended to be classified as *Hedonist* or *Uncommitted*.

**Table 14**  
**Crosstabulation: Astin Type, by Financial Need**

	Financial Need (n/% in Row)					Total
	Low Income	Lower Middle	Upper Middle	High Income	Non-aid Applicant	
Artist	33/19.8	28/16.8	39/23.4	25/15.0	42/25.1	167/100.0
Hedonist	33/15.5	36/16.9	40/18.8	31/14.6	73/34.3	213/100.0
Leader	32/18.0	35/19.7	38/21.3	31/17.4	42/23.6	178/100.0
Scholar	29/22.0	29/22.0	22/16.7	29/22.0	23/17.4	132/100.0
Social Activist	49/21.6	44/19.4	52/22.9	43/18.9	39/17.2	227/100.0
Status Striver	46/23.0	32/16.0	30/15.0	39/19.5	53/26.5	200/100.0
Uncommitted	22/12.3	34/19.0	34/19.0	37/20.7	52/29.1	179/100.0
Total/Overall	244/18.8	238/18.4	255/19.7	235/18.1	324/25.0	1296/100.0

Note:  $X^2$  (24, N = 1296) = 38.72.  $p = .029$ .

## SAT Score

Table 15 contains the descriptive data about SAT scores for the seven Astin types. These descriptive data indicated that *Social Activist* and *Status*

*Striver* types had the lowest mean SAT scores; while the *Scholar* type had the highest mean SAT scores.

**Table 15**  
**Descriptives: SAT Score by Astin Type**

	N	Minimum	Maximum	Mean	Std. Deviation
Artist	167	700	1380	1013.23	136.493
Hedonist	213	710	1550	1008.54	115.535
Leader	178	650	1350	1016.85	130.658
Scholar	132	710	1340	1035.30	146.029
Social Activist	227	500	1280	973.30	134.662
Status Striver	200	720	1300	976.45	117.177
Uncommitted	179	670	1440	1016.31	133.416
Total	1296	500	1550	1002.96	131.241

To more fully explore these data, one-way analysis of variance (ANOVA) was conducted to determine if there were significant differences in mean SAT scores among Astin types. The results of this analysis are shown in Table 16. This analysis indicated that there were statistically significant differences in mean SAT scores among Astin types ( $p < .001$ ). In order to determine where these differences existed, post hoc analyses were performed using the Bonferroni test.



**Table 16**  
**ANOVA for SAT Score**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	568825.416	6	94804.236	5.622	.000
Within Groups	21736596.806	1289	16863.147		
Total	22305422.222	1295			

The results of the post hoc analysis in Table 17 indicated that the differences in SAT scores existed among several Astin types. Specifically, mean SAT scores of *Leaders* were significantly higher than those of *Social Activists* (MD = 43.5,  $p = .017$ ). Mean SAT scores of *Scholars* were significantly higher than those of *Social Activists* (MD = 62.0,  $p < .001$ ) and *Status Strivers* (MD = 58.9,  $p = .001$ ). Mean SAT scores of the *Uncommitted* type were significantly higher than those of *Social Activists* (MD = 43.0,  $p < .001$ ). There were no significant differences observed for any other comparisons of mean SAT scores among the remaining Astin types.

**Table 17**  
**Multiple Comparisons: SAT Scores (Bonferroni)**

(I) Astin Type	(J) Astin Type	Mean Diff. (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
Artist	Hedonist	4.7	13.42	1.000	-36.2	45.5
	Leader	-3.6	13.99	1.000	-46.2	39.0
	Scholar	-22.1	15.12	1.000	-68.1	24.0
	Social Activist	39.9	13.24	.055	-.4	80.2
	Status Striver	36.8	13.61	.147	-4.7	78.2
	Uncommitted	-3.1	13.97	1.000	-45.6	39.4

**Table 17 (Continued)**

(I) Astin Type	(J) Astin Type	Mean Diff. (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
Hedonist	Artist	-4.7	13.42	1.000	-45.5	36.2
	Leader	-8.3	13.19	1.000	-48.5	31.8
	Scholar	-26.8	14.38	1.000	-70.5	17.0
	Social Activist	35.2	12.39	.095	-2.5	73.0
	Status Striver	32.1	12.79	.256	-6.8	71.0
	Uncommitted	-7.8	13.17	1.000	-47.9	32.3
Leader	Artist	3.6	13.99	1.000	-39.0	46.2
	Hedonist	8.3	13.19	1.000	-31.8	48.5
	Scholar	-18.4	14.92	1.000	-63.9	27.0
	Social Activist	43.5(*)	13.00	.017	4.0	83.1
	Status Striver	40.4	13.38	.054	-.3	81.1
	Uncommitted	.5	13.75	1.000	-41.3	42.4
Scholar	Artist	22.1	15.12	1.000	-24.0	68.1
	Hedonist	26.8	14.38	1.000	-17.0	70.5
	Leader	18.4	14.92	1.000	-27.0	63.9
	Social Activist	62.0(*)	14.21	.000	18.7	105.3
	Status Striver	58.9(*)	14.56	.001	14.5	103.2
	Uncommitted	19.0	14.90	1.000	-26.4	64.3
Social Activist	Artist	-39.9	13.24	.055	-80.2	.4
	Hedonist	-35.2	12.39	.095	-73.0	2.5
	Leader	-43.5(*)	13.00	.017	-83.1	-4.0
	Scholar	-62.0(*)	14.21	.000	-105.3	-18.7
	Status Striver	-3.1	12.59	1.000	-41.5	35.2
	Uncommitted	-43.0(*)	12.98	.020	-82.5	-3.5
Status Striver	Artist	-36.8	13.61	.147	-78.2	4.7
	Hedonist	-32.1	12.79	.256	-71.0	6.8
	Leader	-40.4	13.38	.054	-81.1	.3
	Scholar	-58.9(*)	14.56	.001	-103.2	-14.5
	Social Activist	3.1	12.59	1.000	-35.2	41.5
	Uncommitted	-39.9	13.36	.061	-80.5	.8
Uncommitted	Artist	3.1	13.97	1.000	-39.4	45.6
	Hedonist	7.8	13.17	1.000	-32.3	47.9
	Leader	-.5	13.75	1.000	-42.4	41.3
	Scholar	-19.0	14.90	1.000	-64.3	26.4
	Social Activist	43.0(*)	12.98	.020	3.5	82.5
	Status Striver	39.9	13.36	.061	-.8	80.5

\* The mean difference is significant at the .05 level.

### Rank in High School Class

The next input factor examined was rank in high school class. These data were based on institutional records and were recoded into quartiles in order to control for various levels of high school performance. Also, these groups of the student participants by rank in high school quarters are used for purposes of admission decisions at the University (University of Texas at San Antonio, 2006b). Thus these groups were selected to facilitate the explication of the results from the study to educational practitioners and policy-makers. Chi-square test of independence was used to test whether a significant relationship existed between Astin type and rank in high school class. Table 18 depicts the results of this analysis.

**Table 18**  
**Crosstabulation: Astin Type, by Rank in High School Class**

	Rank in HS Class (n/% in Row)				Total
	Bottom Quartile	Third Quartile	Second Quartile	Top Quartile	
Artist	9/5.4	33/19.8	62/37.1	63/37.7	167/100.0
Hedonist	16/7.5	56/26.3	84/39.4	57/26.8	213/100.0
Leader	7/3.9	12/6.7	51/28.7	108/60.7	178/100.0
Scholar	3/2.3	12/9.1	39/29.5	78/59.1	132/100.0
Social Activist	8/3.5	42/18.5	67/29.5	110/48.5	227/100.0
Status Striver	7/3.5	39/19.5	80/40.0	74/37.0	200/100.0
Uncommitted	13/7.3	24/13.4	73/40.8	69/38.5	179/100.0
Total/Overall	63/4.9	218/16.8	456/35.2	559/43.1	1296/100.0

Note:  $X^2$  (18, N = 1296) = 87.74.  $p < .001$ .

The results of the data analysis revealed that rank in high school class and Astin type were not independent  $X^2 (18, N = 1296) = 87.74, p < .001$ . Students in the top quartile of their high school class tended to be classified as *Leader* or *Scholar*. Students in the second quartile tended to be classified as *Hedonist*, *Status Striver* or *Uncommitted* student types. Students in the third quartile of their high school class tended to be classified as *Hedonist*. Students in the bottom quartile tended to be classified as *Hedonist* or *Uncommitted*.

### *Environmental Factors*

#### **First Semester Residence**

The first environmental factor examined was first semester residence. Chi-square test of independence was used to test whether a significant relationship existed between Astin type and first semester residence. The results of this analysis are shown in Table 19.

The data analysis revealed that first semester residence and Astin type were not independent,  $X^2 (6, N = 1296) = 21.01, p = .002$ . Students who chose to live on-campus tended to be classified as *Hedonist* or *Uncommitted*. Students who were classified as *Artist*, *Leader*, or *Scholar* were more likely to live off-campus.

**Table 19****Crosstabulation: Astin Type, by First Semester Residence**

	First Semester Residence (n/% in Row)		Total
	On-Campus	Off-Campus	
Artist	57/34.1	110/65.9	167/100.0
Hedonist	98/46.0	115/54.0	213/100.0
Leader	55/30.9	123/69.1	178/100.0
Scholar	40/30.3	92/69.7	132/100.0
Social Activist	99/43.6	128/56.4	227/100.0
Status Striver	84/42.0	116/58.0	200/100.0
Uncommitted	82/45.8	97/54.2	179/100.0
Total/Overall	515/39.7	781/60.3	1296/100.0

Note:  $X^2$  (6, N = 1296) = 21.01.  $p = .002$ .

**Entry-College**

The second environmental factor examined was entry-college. These data were based on institutional records. A listing of the specific majors that comprise each college category is provided in Appendix C. Chi-square test of independence was used to test whether a significant relationship existed between Astin type and choice of entry-college. The results of this analysis can be seen in Table 20.

The data analysis revealed that choice of entry-college and Astin type were not independent,  $X^2$  (24, N = 1296) = 120.92,  $p < .001$ . Students who chose Business as their entry-college tended to be classified as *Status Strivers*. Students entering Education tended to be classified as *Social Activist*. Students who chose Liberal and Fine Arts as their entry-college tended to be classified as

*Artist or Social Activist.* Students who chose Sciences and Engineering as their entry-college tended to be classified as *Scholar*. Students who were undecided about their choice of major tended to be *Hedonist* or *Uncommitted*.

**Table 20**  
**Crosstabulation: Astin Type, by Entry-College**

	Entry-College (n/% in Row)					Total
	Business	Education	Liberal and Fine Arts	Sciences and Engineering	Undecided	
Artist	10/6.0	11/6.6	66/39.5	32/19.2	48/28.7	167/100.0
Hedonist	33/15.5	16/7.5	51/23.9	55/25.8	58/27.2	213/100.0
Leader	26/14.6	18/10.1	42/23.6	57/32.0	35/19.7	178/100.0
Scholar	21/15.9	9/6.8	12/9.1	70/53.0	20/15.2	132/100.0
Social Activist	28/12.3	22/9.7	64/28.2	65/28.6	48/21.1	227/100.0
Status Striver	44/22.0	11/5.5	35/17.5	66/33.0	44/22.0	200/100.0
Uncommitted	21/11.7	15/8.4	35/19.6	38/21.2	70/39.1	179/100.0
Total/Overall	183/14.1	102/7.9	305/23.5	383/29.6	323/24.9	1296/100.0

Note:  $X^2$  (24, N = 1296) = 120.92.  $p < .001$ .

### Semester Credit Hours Attempted

The third environmental factor examined was the number of semester credit hours attempted during the first semester of enrollment. These data were based on each student participant's institutional enrollment record (e.g. hours attempted, grades, etc.). Table 21 contains the descriptive data about semester credit hours (SCH) attempted for the seven Astin types.

The number of SCH attempted ranged between 6 and 20 for all Astin types. *Status Striver* students had the widest range in the number of SCH attempted among Astin types (6-20 SCH); while *Uncommitted* students had the narrowest range (9-17 SCH). In general, higher mean SCH attempted were seen in three Astin types; namely, *Uncommitted* (M = 13.38, SD = 1.773), *Scholar* (M=13.30, SD 1.781), and *Status Striver* (M = 13.28, SD = 1,751).

**Table 21**

**Descriptives: Semester Credit Hours Attempted by Astin Type**

	N	Minimum	Maximum	Mean	Std. Deviation
Artist	167	6	18	13.13	1.792
Hedonist	213	6	16	12.98	1.724
Leader	178	6	18	13.20	1.864
Scholar	132	6	19	13.30	1.781
Social Activist	227	9	19	13.24	1.746
Status Striver	200	6	20	13.28	1.751
Uncommitted	179	9	17	13.38	1.771
Total	1296	6	20	13.21	1.773

To more fully explore this data, one-way analysis of variance (ANOVA) was conducted to determine if there were significant differences in mean family income among the seven Astin types. As depicted in Table 22, the results of this analysis revealed no statistically significant differences in the number of SCH attempted among Astin types (  $p = .407$ ).

**Table 22**  
**ANOVA Semester Credit Hours Attempted**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19.330	6	3.222	1.025	.407
Within Groups	4050.420	1289	3.142		
Total	4069.750	1295			

### **Academic Course Difficulty**

The fourth environmental factor examined was academic course difficulty. These data were based on each student participant's institutional enrollment record (e.g. hours attempted, grades, etc.). Academic course difficulty was based on of the percentage of all students receiving a grade in the course who received grade of either a 'D' or an 'F'. The determination of a student participant's first-semester academic course difficulty was calculated via the weighted average difficulty of all the college-credit, letter-graded courses in which they were enrolled (Szafran, 2001). Table 23 contains the descriptive data related to academic course difficulty for the each of seven Astin types.

These descriptive data indicated that *Status Striver* ( $M = .669$ ,  $SD = .2244$ ) had the highest mean academic course difficulty among Astin types, followed by the *Hedonist* ( $M = .659$ ,  $SD = .2152$ ) type. The lowest mean academic course difficulty was revealed in two types: Artist ( $M = .626$ ,  $SD = .2053$ ) and Social Activist ( $M = .626$ ,  $SD = .2239$ ). To more fully explore this data, one-way analysis of variance (ANOVA) was conducted to determine if



there were significant differences in mean academic course difficulty among the seven Astin types. As depicted in Table 24, the results of this analysis revealed no significant differences in the number of SCH attempted between Astin types ( $p = .369$ ).

**Table 23**  
**Descriptives: Academic Difficulty**

	N	Minimum	Maximum	Mean	Std. Deviation
Artist	167	.136	1.520	.626	.2053
Hedonist	213	.200	1.308	.659	.2152
Leader	178	.207	1.570	.648	.2333
Scholar	132	.151	1.701	.638	.2249
Social Activist	227	.121	1.263	.626	.2239
Status Striver	200	.216	1.311	.669	.2244
Uncommitted	179	.208	1.316	.645	.2081
Total	1296	.121	1.701	.645	.2196

**Table 24**  
**ANOVA Academic Difficulty by Astin Type**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.314	6	.052	1.085	.369
Within Groups	62.133	1289	.048		
Total	62.446	1295			

### First-Year Seminar

The fourth environmental factor examined was enrollment in a first-year seminar course. Chi-square test of independence was used to determine whether a significant relationship existed between Astin type and enrollment in a first-year seminar course. Table 25 depicts the results of this analysis. The data analysis revealed that first semester residence and Astin type were independent,  $X^2 (6, N = 1296) = 8.29, p = .218$ . Thus enrollment in a first-year seminar and Astin type were not related.

**Table 25**

**Crosstabulation: Astin Type, by First-year Seminar**

	First-year Seminar Enrollment (n/% in Row)		Total
	Freshman Seminar	No Freshman Seminar	
Artist	17/10.2	150/89.8	167/100.0
Hedonist	24/11.3	189/88.7	213/100.0
Leader	17/9.6	161/90.4	178/100.0
Scholar	22/16.7	110/83.3	132/100.0
Social Activist	22/9.7	205/90.3	227/100.0
Status Striver	15/7.5	185/92.5	200/100.0
Uncommitted	16/8.9	163/91.1	179/100.0
Total/Overall	133/10.3	1163/89.7	1296/100.0

Note:  $X^2 (6, N = 1296) = 8.29, p = .218$ .

### Supplemental Instruction

The final environmental factor examined was participation in Supplemental Instruction (SI). Chi-square test of independence was used to test

whether a significant relationship existed between Astin type and participation in SI. The results of this analysis are shown in Table 26. The data analysis revealed that participation in SI and Astin type were not independent,  $X^2 (6, N = 1296) = 25.32, p < .001$ . Students who participated in SI were more likely to be classified as *Social Activist* or *Uncommitted*. Students classified as the *Hedonist* were less likely to participate in SI.

**Table 26**

**Crosstabulation: Astin Type, by Supplemental Instruction Participation**

	Supplemental Instruction (n/% in Row)		Total
	Participant	Non-participant	
Artist	79/47.3	88/52.7	167/100.0
Hedonist	87/40.8	126/59.2	213/100.0
Leader	98/55.1	80/44.9	178/100.0
Scholar	61/46.2	71/53.8	132/100.0
Social Activist	140/61.7	87/38.3	227/100.0
Status Striver	109/54.5	91/45.5	200/100.0
Uncommitted	102/57.0	77/43.0	179/100.0
Total/Overall	676/52.2	620/47.8	1296/100.0

Note:  $X^2 (6, N = 1296) = 25.32, p < .001$

## Retention

Chi-square test of independence was used to test whether a significant relationship existed between Astin Types and first-to-second year retention. The results of this analysis are shown in Table 27. The data analysis revealed that first-to-second year retention and Astin type were not independent participation,

$\chi^2 (6, N = 1296) = 24.33, p < .001$ . Students who were classified as *Scholar* or *Leader* were more likely to persist to the second year. Students who were classified as *Hedonist* or *Uncommitted* were less likely to persist to the second year.

**Table 27**  
**First-to-Second Year Retention Rates, by Astin Type**

	Retained (n/% in Row)		Total
	Non-persistor	Persistor	
Artist	66/39.5	101/60.5	167/100.0
Hedonist	109/51.2	104/48.8	213/100.0
Leader	58/32.6	120/67.4	178/100.0
Scholar	39/29.5	93/70.5	132/100.0
Social Activist	84/37.0	143/63.0	227/100.0
Status Striver	86/63.0	114/57.0	200/100.0
Uncommitted	80/44.7	99/55.3	179/100.0
Total/Overall	522/40.3	774/59.7	1296/100.0

Note:  $\chi^2 (6, N = 1296) = 24.33, p < .001$

### *Summary of Preliminary Analyses*

Based on these preliminary data analyses, it was concluded that the sample used for this study was comparable to the overall first-year student population. There were no significant differences found between student participants and non-completers based on gender, ethnicity, and SAT scores. There were differences found between student participants and non-completers with respect to first generation status and rank in high school class. These

differences between the survey groups were considered during the interpretation of results for the logistic regression model analyses.

The examination of input and environmental factors among Astin types revealed several differences with respect to the factors included in this study, particularly with respect to the outcome of first-to-second year re-enrollment (retention). Based on these findings and the complex nature of the relationships among the study factors, multivariate logistic regression was also used to analyze the impact of these relationships while controlling for other factors. The remainder of this chapter is organized around the following research questions, framed by Astin's Input-Environment-Outcome (I-E-O) model:

1. To what extent do the pre-entry (input) factors (gender, ethnicity, first-generation status, financial need, SAT scores, rank in high school class, and Astin type derived from the *Cooperative Institutional Research Program (CIRP) Freshman Survey*) predict retention (output) of selected undergraduate students at the University of Texas at San Antonio?
2. To what extent do Astin type (input) and post-entry (environmental) factors (first-semester residence, entry-college, semester credit hours attempted, academic course difficulty, participation in Supplemental Instruction, and enrollment in a first-year seminar course) impact retention (output) of selected undergraduate students at the University of Texas at San Antonio?
3. To what extent does the combination of pre-entry factors (inputs), post-

entry factors (environmental) impact selected undergraduate student retention (output) of freshmen at the University of Texas at San Antonio?

4. To what extent does the combination of pre-entry factors (inputs), post-entry factors (environmental) impact the retention of students identified as a particular Astin type at the University of Texas at San Antonio?

This method of organizing the results was chosen since it parallels the entry and enrollment sequence of a student's transition into the university. Separate logistic regression analyses were performed to determine how well each set of independent variables predicted retention.

### **Logistic Regression Analyses**

As previously stated in Chapter III, when researching a dichotomous dependent factor such as retention; logistic regression is “more flexible than other techniques” (Tabachnick & Fidell, 2007, p. 437). The flexibility of logistic regression is due to the limited number of statistical assumptions the technique requires and its capacity to predict the probability of a dichotomous outcome using a mix of categorical and continuous factors. The primary assumptions and limitations of logistic regression are (a) an appropriate ratio of cases to variables; (b) a student participant can only be in one outcome category at a time (i.e. persistor vs. non-persistor); (c) the absence of high correlation among predictor variables (multicollinearity); and (d) the absence of outliers.

Multicollinearity exists when there is a high degree of correlation between two or more predictor factors. The presence of a strong correlation between two

or more predictor factors can mask the effects that an individual predictor factor may have on the dependent factor being studied. Two approaches are recommended to determine the presence of multicollinearity (a) an analysis of the correlation between predictor variables, and (b) an analysis tolerance and variable inflation factor (VIF) statistics (George & Mallery, 2006; Tabachnick & Fidell, 2007). Correlation statistics provide an initial examination of the relationship between pairs of predictor factors. Spearman's rank correlation is a statistical method that can be used to assess the direction (positive or negative) and strength of the relationship between categorical factors (Ott & Longnecker, 2004).

According to Menard (2002), correlation coefficients greater than or equal to .80 indicate a likelihood of collinearity. Table 28 reveals the Spearman correlation matrix for all of the predictor factors included in this study. Although the correlations between several of the factors were found to be statistically significant, all of the associations were cited as being small to moderate. The strongest relationship among factors was found to exist between SAT scores and semester credit hours attempted, where a moderate positive correlation ( $r_s = .34$ ) was observed.

George and Mallery (2006) recommend using the collinearity diagnostic features of SPSS; these features provide a more robust examination of the relationships between factors and therefore offer better detection of multicollinearity threats. These diagnostic features include tolerance and

variable inflation factor (VIF) statistics. According to Garson (2008), tolerance values less than 0.2 and VIF values equal to or greater than 4.0 are commonly used to determine whether multicollinearity is a problem. The analysis of the tolerance and VIF values revealed no tolerance values less than 0.2 and no VIF values greater than 4.0, which confirmed the absence of multicollinearity among predictor factors. The absence of multicollinearity among the study factors provided empirical data to support the choice of logistic regression techniques to answer the remaining research questions.

Several authors (e.g. Mertler & Vannatta, 2005; Tabachnick & Fidell, 2007) recommend presenting the results of logistic regression models in the form of odds ratios. Odds ratios are calculated by dividing the probability of an outcome occurring by the probability of the event not occurring (Agresti, 2002).

The odds ratios presented in this study represent a change in the odds of a student participant being classified as a persistor (i.e. returning to the institution for the second year of college). This change in odds was associated with either a one unit increase in a continuous predictor factor (e.g. semester hours attempted), or membership in a categorical factor (e.g. gender = male). For example, the odds ratio for the predictive factor of gender equal to male reflects the change (if any) in the odds of being retained for male students compared to female students. An odds ratio equal to one indicated that the factor had no practical effect for the prediction of retention. An odds ratio less than one meant that the odds of a student participant being retained were



decreased; while an odds ratio greater than one meant the odds a student participant being retained were increased.

Both the Wald statistic and degrees of freedom are used to determine the statistical significance of the effect (B coefficient) that a predictive factor has on retention (George & Mallery, 2006). The Wald statistic is considered to be a very conservative test of significance, therefore a more liberal alpha level ( $\alpha = .10$ ) is recommended when interpreting the statistical significance of a factor used in a logistic regression model (Mertler & Vannatta, 2005). This study employed the use of classification tables to reflect the predictive accuracy of each logistic regression model. A classification table compares predicted outcome of retention (persistor or non-persistor) based on a logistic regression model to the actual outcome, of whether the student was retained or not.

**Table 28****Correlations: Predictor Factor Multicollinearity Analysis (Spearman's)**

	Gender	Ethnicity	First Generation Status	Financial Need	SAT	Rank in HS Class	First Semester Residence	Entry- College	SCH Attempted	Academic Difficulty	SI	Seminar	Astin Type
Gender	1.00												
Ethnicity	-.01	1.00											
First Generation Status	-.06**	.18**	1.00										
Financial Need	-.06**	.10**	.07**	1.00									
SAT Score	.16**	-.21**	-.26**	-.05**	1.00								
Rank in HS Class	-.15**	.08**	.11**	.08**	.09**	1.00							
First semester residence	-.02	-.09**	-.03	.04	.03	-.11**	1.00						
Entry-College	.02	.05**	.03**	.01	-.13**	-.07**	-.03	1.00					
SCH Attempted	.04**	-.04**	-.21**	-.02	.34**	.07**	.20**	-.09**	1.00				
Academic Difficulty	.00	.01	.03**	-.04**	-.05**	-.06**	-.05	.00	-.15**	1.00			
SI	-.14**	.09**	-.02	.03**	-.11**	.07**	.09**	.07**	.10**	-.01	1.00		
Seminar	.00	.01	.01	.04**	-.03**	-.02*	.06*	-.04**	-.05**	-.01	.00	1.00	
Astin Type	-.02	.07*	-.03	.03	-.06*	.03	.05	.02	.06*	.01	.10**	-.03	1.00

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

*Findings for Research Question One (Input Model)*

*To what extent do the pre-entry (input) factors (gender, ethnicity, first-generation status, financial need SAT scores, rank in high school class, and Astin type derived from the Cooperative Institutional Research Program (CIRP) Freshman Survey) predict retention (output) of selected undergraduate students at the University of Texas at San Antonio?*

Backward stepwise logistic regression analysis was conducted using the input factors as predictors of retention from the first-to-second year of college using SPSS Binary Logistics. Data from all 1,296 first year student participants were included in the analysis. The *Scholar* type, which was the Astin type with the highest retention rate, was chosen as the reference category. The choice of this particular Astin type allowed for more clear comparisons to be made of the relative risk of attrition (if any) associated with the other Astin types. Data screening revealed no outliers. The results of the analysis indicated that the overall model that included gender, ethnicity, first-generation status, financial need SAT scores, rank in high school class, and Astin type was statistically reliable in predicting retention (Goodness-of-fit test = 50.69;  $\chi^2$  (10, N = 1296),  $p < .001$ ). The regression coefficients, Wald statistics and odds ratios for the factors in the final input only model are presented in Table 29.

Three input factors that were useful for the prediction of first-to second year retention were ethnicity, rank in high school class, and Astin type. Hispanic students were approximately 1.4 times more likely to be retained, when all other

factors were held constant. A lower rank in high school class had a negative impact on retention. Students ranked in the bottom quartile of their high school class were approximately .56 times as likely to be retained, with all other factors held constant. In other words, the odds of retention for students in ranked in the bottom quartile of their high school class were decreased by 44% compared to students ranked in the top quartile of their high school class. Students in the second and third high school quartiles were approximately two-thirds as likely to be retained, with all other factors held constant. A student classified as *Hedonist* was approximately .48 times as likely to be retained, with all other factors held constant, which signified a decrease of over 50% in the odds of being retained. A student classified as *Status Striver* or *Social Activist* was approximately .60 times as likely to be retained, with all other factors held constant.

**Table 29**  
**Model of the Effect of Input Factors on Retention of Student Participants**

	B	S.E.	Wald	df	Sig.	Odds Ratio
Ethnicity			11.344	3	.010	
Hispanic	.306	.126	5.847	1	.016	1.36
Rank in HS Class			13.139	3	.004	
Bottom Quartile	-.573	.273	4.421	1	.036	.56
Third Quartile	-.466	.168	7.658	1	.006	.63
Second Quartile	-.393	.134	8.603	1	.003	.68
Astin Type			13.711	6	.033	
Hedonist	-.745	.241	9.531	1	.002	.48
Status Striver	-.505	.242	4.354	1	.037	.60
Uncommitted	-.534	.247	4.676	1	.031	.59

A classification table is a cross-tabulation of the observed and predicted outcomes to illustrate the predictive accuracy of the model. Table 30 shows the classification table for the inputs only model. The input factor model correctly classified 60.7% of all cases. Notably, the inputs only model was better able to correctly classify 86.6% of the student participant persistors, but only 22.4% of the non-persistors.

**Table 30**  
**Classification Table: Input Factors Model**

Observed	Predicted		
	Retained		Percentage Correct
	Non-persistors	Persistor	
Non-persistors	117	405	22.4
Persistor	104	670	86.6
Overall Percentage			60.7

*Findings for Research Question Two (Environment Model)*

*To what extent do the Astin type (input) and post-entry (environmental) factors (first-semester residence, entry-college, semester credit hours attempted, academic course difficulty, participation in Supplemental Instruction, and enrollment in a first-year seminar course) impact retention (output) of selected undergraduate students at the University of Texas at San Antonio?*

Backward stepwise logistic regression analysis was conducted using the environmental factors and Astin type as predictors of retention from the first-to-second year of college using SPSS Binary Logistics. Data screening revealed no

outliers. Data from all 1,296 first year student participants were included in the analysis. The *Scholar* type was used as the reference category.

The results of the analysis indicated that the overall model that included first-semester residence, entry-college, semester credit hours attempted, academic course difficulty, participation in Supplemental Instruction, and enrollment in a first-year seminar course, and Astin type was statistically reliable in predicting retention (Goodness-of-fit test = 116.60;  $\chi^2$  (15, N = 1296),  $p < .001$ ). The regression coefficients, Wald statistics and odds ratios for the factors in the final environment factor model are presented in Table 31.

**Table 31**

**Model of the Effect of Environmental Factors and Astin Type on Retention of Student Participants**

	B	S.E.	Wald	df	Sig.	Odds Ratio
Astin Type			17.769	6	.007	
Hedonist	-.819	.247	10.946	1	.001	.44
Status Striver	-.484	.249	3.773	1	.052	.62
Uncommitted	-.475	.257	3.427	1	.064	.62
On-campus	-.296	.125	5.610	1	.018	.74
Entry-College			9.767	4	.045	
Sciences & Engineering	.506	.167	9.134	1	.003	1.66
Academic Difficulty	-.947	.276	11.792	1	.001	.39
SCH Attempted	-.233	.036	41.377	1	.000	.80
SI Participation	.425	.122	12.151	1	.000	1.53
Seminar	.530	.216	6.045	1	.014	1.70

Seven environmental factors that were useful for the prediction of first-to-second year retention were (a) Astin type, (b) on-campus residence, (c) entry-college, (d) academic difficulty, (e) semester credit hours (SCH) attempted, (f) SI participation, and (g) first-year seminar course enrollment. All three Astin types in the final model had a negative impact on retention. Students who were classified as *Hedonist* were approximately .44 times as likely to be retained, with all other factors held constant, which signified a decrease of 56% in the odds of these student being retained. *Status Striver* and *Uncommitted* students were approximately .62 times as likely to be retained, with all other factors held constant.

Three environmental factors had a negative impact on first-to-second year retention (a) on-campus residence, (b) academic difficulty, and (c) semester credit hours attempted. A student living on-campus was approximately .74 times less likely to be retained, with all other factors held constant. For every unit increase in academic difficulty, students were approximately .39 times as likely to be retained, with all other factors held constant. Therefore, as course difficulty was increased, the odds of retention were decreased by approximately 61%. For every unit increase in semester credit hours attempted, students were approximately .80 times as likely to be retained, with all other factors held constant.

Three environmental factors had a positive impact on first-to-second year retention (a) choice of entry-college, (b) first-year seminar, and (c) SI

participation. A student whose entry-college was Sciences and Engineering was approximately 1.7 times more likely to be retained, with all other factors held constant. A student enrolled in a first-year seminar was approximately 1.7 times more likely to be retained, with all other factors held constant. A student participating in SI was approximately 1.5 times more likely to be retained, with all other factors held constant.

Table 32 shows the classification table for the model that included Astin type and environmental factors. The environment factor model correctly classified 65.0% of all cases, which was an improvement over the inputs only model (60.7%). The improvement in classification accuracy compared to the inputs factor model was due to an increase in the correct identification of non-persistors. The environment factor model correctly classified 38.1% of the non-persistors compared to the inputs only model that correctly classified only 22.4% of non-persistors.

**Table 32**  
**Classification Table: Environment Factor Model**

	Predicted		Percentage Correct
	Retained	Persistor	
Observed	Non-persistors	Persistor	
Non-persistors	199	323	38.1
Persistor	131	643	83.1
Overall Percentage			65.0



*Findings for Research Question Three (Input and Environment Model)*

*To what extent does the combination of pre-entry factors (inputs), post-entry factors (environmental) impact selected undergraduate student retention (output) of freshmen at the University of Texas at San Antonio?*

Backward stepwise logistic regression analysis was conducted using input and environmental factors as predictors of retention from the first-to-second year of college using SPSS Binary Logistics. Data screening revealed no outliers. Data from all 1,296 first year student participants were included in the analysis. The *Scholar* type was used as the reference category.

The results of the analysis indicated that the overall model that included ethnicity, gender, first generation status, financial need, SAT score, rank in high school class, first-semester residence, entry-college, semester credit hours attempted, academic course difficulty, participation in Supplemental Instruction, and enrollment in a first-year seminar course, and Astin type was statistically reliable in predicting retention (Goodness-of-fit test = 127.04;  $\chi^2$  (21, N = 1296),  $p < .001$ ). The regression coefficients, Wald statistics and odds ratios for the factors in the final environment factor model are presented in Table 33.

Nine factors that were useful for the prediction of first-to second year retention were (a) ethnicity, (b) rank in high school class, (c) SAT Score, (d) Astin type, (e) first semester residence, (f) academic difficulty, (g) semester credit hours attempted, (h) SI participation, and (i) enrollment in a first-year seminar course. Black Non-Hispanic students were 1.6 times more likely to be

retained, with all other factors held constant. Hispanic students were 1.2 times more likely to be retained, with all other factors held constant.

**Table 33**

**Model of the Effect of Input and Environmental Factors on Retention of Student Participants**

	B	S.E.	Wald	df	Sig.	Odds Ratio
Ethnicity			6.746	3	.080	
Black Non-Hispanic	.456	.247	3.403	1	.065	1.58
Hispanic	.224	.135	2.751	1	.097	1.25
Rank in HS Class			10.339	3	.016	
Bottom Quartile	-.485	.283	2.942	1	.086	.62
Third Quartile	-.453	.175	6.714	1	.010	.64
Second Quartile	-.351	.138	6.493	1	.011	.71
SAT Score	.001	.000	4.304	1	.038	1.00
Astin Type			12.073	6	.060	
Hedonist	-.741	.252	8.677	1	.003	.48
Status Striver	-.423	.253	2.808	1	.094	.66
Uncommitted	-.509	.256	3.943	1	.047	.60
On-campus	-.279	.127	4.853	1	.028	.76
Academic Difficulty	-.945	.277	11.668	1	.001	.39
SCH Attempted	-.235	.037	40.123	1	.000	.79
SI Participation	.448	.123	13.193	1	.000	1.57
Seminar	.590	.217	7.431	1	.006	1.81

Two input factors had a negative impact on retention—rank in high school graduating class and Astin type. Students in the bottom and third high school quartiles were approximately .60 times as likely to be retained, with all other factors held constant, which represented a 40% decrease in the odds of being

retained. Students in the second high school quartile were approximately .70 times as likely to be retained, with all other factors held constant. All three Astin types in the final model had a negative impact on retention.

Students who were classified as *Hedonist* were approximately .48 times as likely to be retained, with all other factors held constant. *Uncommitted* students were approximately .60 times as likely to be retained, with all other factors held constant. *Status Striver* students were approximately .66 times as likely to be retained, with all other factors held constant. SAT scores although significant, had no practical significance based on an odds ratio equal to 1.0.

Three environmental factors had a negative impact on first-to-second year retention, namely on-campus residence, academic difficulty, and credit hours attempted. A student living on-campus was approximately .76 times as likely to be retained as a student living off-campus, with all other factors held constant. For every unit increase in academic difficulty, students were approximately .79 times as likely to be retained, with all other factors held constant. For every unit increase in semester credit hours attempted, students were approximately .39 times as likely to be retained, with all other factors held constant, which represented a 61% decrease in the odds of retention.

Three environmental factors had a positive impact on first-to-second year retention, namely first-year seminar, SI participation, and entering as Sciences and Engineering student. A student enrolled in a first-year seminar was approximately 1.8 times more likely to be retained, with all other factors held

constant. A student participating in SI was approximately 1.6 times more likely to be retained, with all other factors held constant.

Table 34 shows the classification table for the input and environment factor model. The input and environment factor model correctly classified 66.4% of all cases, which was a slight improvement over the environmental factor only model (65.0%). The improvement in classification accuracy compared to the environment factor model was due to an increase in the correct identification of non-persistors. The input and environmental factor model correctly classified 41.0 % of the non-persistors compared the environment factor model that correctly classified 38.1% of non-persistors.

**Table 34**

**Classification Table: Input and Environment Factor Model**

Observed	Predicted		Percentage Correct
	Retained	Persistor	
Non-persistors	214	308	41.0
Persistor	128	646	83.5
Overall Percentage			66.4

The improvement in predictive accuracy over the other models was seen in the correct identification of non-persistors. The input and environment factor model correctly identified 41.0% of the non-persistors compared to the environment only model, which correctly identified 38.1% of non-persistors.

The next step of the analysis was to determine whether different factors impact the retention of the different Astin types through separate analyses. The model that included both input and environment factors was used for these analyses. The choice of this model was based on the improved predictive accuracy observed in the input and environment factor model.

*Findings for Research Question Four (Models by Astin Type)*

*To what extent does the combination of pre-entry factors (inputs), post-entry factors (environmental) impact the retention of students identified as a particular Astin type at the University of Texas at San Antonio?*

**Artist Model**

Backward stepwise logistic regression analysis was conducted using input and environment factors as predictors of retention of students classified as *Artist* (N = 167) from the first-to-second year of college using SPSS Binary Logistics. Data screening revealed no outliers.

The results of the analysis indicated that the overall model that included both input and environment factors was statistically reliable in predicting retention of students classified as *Artist* (Goodness-of-fit test = 29.91;  $\chi^2$  (7, N = 167),  $p < .001$ ). The regression coefficients, Wald statistics and odds ratios for the factors in the final *Artist* model are presented in Table 35. The factors that were useful for the prediction of first-to second year retention of the *Artist* type were gender, rank in high school class, academic difficulty, and credit hours attempted.

Two input factors had a negative impact on the retention of students classified as *Artist*—gender and rank in high school class. Males classified as *Artist* were half as likely to be retained as their female peers, with all other factors held constant. A lower rank in high school class had a negative impact on retention. Students classified as *Artist* that were ranked in the third quartile of their high school class were approximately .23 times as likely to be retained, with all other factors held constant, which signified a 77% decrease in the odds of being retained.

**Table 35**

**Model of the Effect of Input and Environmental Factors on Artist Student Retention**

	B	S.E.	Wald	df	Sig.	Odds Ratio
Male	-.656	.358	3.351	1	.067	.52
Rank in HS Class			9.430	3	.024	
Third Quartile	-1.471	.487	9.126	1	.003	.23
Academic Difficulty	-2.911	.914	10.131	1	.001	.05
Credit Hours Attempted	-.204	.098	4.315	1	.038	.82

Two environment factors had a negative impact on first-to-second year retention of students classified as *Artist*, namely academic difficulty and semester credit hours attempted. For every unit increase in academic difficulty, students classified as *Artist* were approximately .05 times as likely to be retained, with all other factors held constant, which indicated a 95% decrease in the odds of being retained. For every unit increase in semester credit hours

attempted, *Artist* students were approximately .82 times as likely to be retained, with all other factors held constant.

Table 36 shows the classification table for the *Artist* model. The final *Artist* model correctly classified 72.5% of all cases.

**Table 36**

**Classification Table: Artist Model**

Observed	Predicted		Percentage Correct
	Retained	Persistor	
Non-persistors	36	30	54.5
Persistors	16	85	84.2
Overall Percentage			72.5

### **Hedonist Model**

Backward stepwise logistic regression analysis was conducted using input and environmental factors as predictors of retention of students classified as *Hedonist* (N = 213) from the first-to-second year of college using SPSS Binary Logistics. Data screening revealed no outliers.

The results of the analysis indicated that the overall model that included both input and environment factors was statistically reliable in predicting retention (Goodness-of-fit test = 41.83;  $X^2$  (7, N = 213),  $p < .001$ ). The regression coefficients, Wald statistics and odds ratios for the factors in the final *Hedonist* model are presented in Table 37.

The factors that were useful for the prediction of first-to-second year retention of the students classified as *Hedonist* were gender, academic difficulty, semester credit hours attempted, SI participation, and choice of entry-college. Males classified as *Hedonist* were 1.8 times more likely to be retained compared to their female peers, with all other factors held constant.

**Table 37**

**Model of the Effect of Input and Environmental Factors on Hedonist Student Retention**

	B	S.E.	Wald	df	Sig.	Odds Ratio
Gender: Male	.604	.319	3.592	1	.058	1.83
Academic Difficulty	-2.774	.760	13.303	1	.000	.06
SCH Attempted	-.242	.091	7.148	1	.008	.79
SI Participation	1.219	.321	14.423	1	.000	3.39
Business	.995	.437	5.176	1	.023	2.71

Two environmental factors had a negative impact on the retention of students classified as *Hedonist*—academic difficulty and semester credit hours attempted. For every unit increase in academic difficulty, students classified as *Hedonist* were approximately .06 times as likely to be retained, with all other factors held constant—a decrease of over 95% in the odds of being retained. For every unit increase in semester credit hours attempted, students classified as *Hedonist* were approximately .79 times as likely to be retained, with all other factors held constant.



Two environmental factors had a positive impact on the retention of students classified as *Hedonist*—Supplemental Instruction and Business as the college of entry. Students classified as *Hedonist* who participated in SI were approximately 3.4 times more likely to be retained than non-SI participants, with all other factors held constant. Students classified as *Hedonist* that chose the college of Business as their entry-college were approximately 2.7 times more likely to be retained, with all other factors held constant.

Table 38 shows the classification table for the Hedonist student model. The final *Hedonist* model correctly classified 70.0% of all cases.

**Table 38**  
**Classification Table: Hedonist Model**

Observed	Predicted		Percentage Correct
	Retained		
	Non-persistors	Persistor	
Non-persistors	80	29	73.4
Persistor	35	69	66.3
Overall Percentage			70.0

### **Leader Model**

Backward stepwise logistic regression analysis was conducted using input and environmental factors as predictors of retention of students classified as *Leader* (N = 169) from the first-to-second year of college using SPSS Binary Logistics. This analysis excluded Black Non-Hispanic students due to the low

number of students in the sample (n=9). Data screening revealed no outliers.

The results of the analysis indicated that the overall model that included both input and environment factors was statistically reliable in predicting retention (Goodness-of-fit test = 37.52;  $\chi^2$  (7, N = 169),  $p < .001$ ). The regression coefficients, Wald statistics and odds ratios for the factors in the final model are presented in Table 39.

**Table 39**

**Model of the Effect of Input and Environmental Factors on Leader Student Retention**

	B	S.E.	Wald	df	Sig.	Odds Ratio
Rank in HS Class			9.708	3	.021	
Bottom Quartile	-2.383	1.061	5.040	1	.025	.09
Third Quartile	-1.833	.717	6.531	1	.011	.16
Financial Need			9.624	4	.047	
Low Income	-1.612	.634	6.465	1	.011	.20
Academic Difficulty	-2.468	.854	8.346	1	.004	.09
SCH Attempted	-.418	.117	12.668	1	.000	.66

The factors that were useful for the prediction of first-to-second year retention of the *Leader* type were rank in high school class, financial need, academic difficulty, and the number of semester credit hours attempted. Two input factors had a negative impact on *Leader* student retention— rank in high school class and financial need. Students classified as *Leader* in the bottom high school quartile were approximately .09 times as likely to be retained as peers in the top high school quartile. Students classified as *Leader* in the third high

school quartile were approximately .16 times as likely to be retained as Leaders in the top high school quartile. Therefore, the odds of retention for students classified as *Leader* ranked in the bottom two quartiles of their high school graduating class were decreased by 84% or more. Students classified as *Leader* with high financial need (low income) were approximately .20 times as likely to be retained as non-aid applicant peers, which corresponded to an 80% decrease in their odds of retention.

Two environment factors had a negative impact on the retention of students classified as *Leader*—academic difficulty and semester credit hours attempted. For every unit increase in academic difficulty, students classified as *Leader* were approximately .09 times as likely to be retained, with all other factors held constant. Therefore, as course difficulty was increased for students classified as *Leader*, their odds of retention were decreased by nearly 90%. For every unit increase in semester credit hours attempted, students classified as *Leader* were approximately .66 times as likely to be retained, with all other factors held constant.

Table 40 shows the classification table for the *Leader* model. The final *Leader* model correctly classified 71.6% of all cases.

**Table 40****Classification Table: Leader Model**

Observed	Predicted		
	Retained		Percentage Correct
	Non-persistors	Persistor	
Non-persistors	26	32	44.8
Persistor	16	95	85.6
Overall Percentage			71.6

**Scholar Model**

Backward stepwise logistic regression analysis was conducted using input and environmental factors as predictors of retention of students classified as *Scholar* (N = 132) from the first-to-second year of college using SPSS Binary Logistics. Data screening revealed no outliers.

The results of the analysis indicated that the overall model that included both input and environment factors was statistically reliable in predicting retention (Goodness-of-fit test = 13.28;  $\chi^2$  (2, N = 132),  $p = .001$ ). The regression coefficients, Wald statistics and odds ratios for the factors in the final model are presented in Table 41.

**Table 41****Model of the Effect of Input and Environmental Factors on Scholar Student Retention**

	B	S.E.	Wald	df	Sig.	Odds Ratio
SCH Attempted	-.381	.121	9.837	1	.002	.68

Semester credit hours attempted was the only factor useful for the prediction of first-to-second year retention of the *Scholar* type. For every unit increase in semester credit hours attempted, students classified as *Scholar* were approximately .68 times as likely to be retained, with all other factors held constant, which corresponded to a decrease of over 30% in their odds of retention.

Table 42 shows the classification table for the final *Scholar* model. The final *Scholar* model correctly classified 72.0% of all cases.

**Table 42**

**Classification Table: Scholar Model**

Observed	Predicted		
	Retained		Percentage Correct
	Non-persistors	Persistor	
Non-persistors	4	35	10.3
Persistor	2	91	97.8
Overall Percentage			72.0

### **Social Activist Model**

A backward stepwise logistic regression analysis was performed using input and environmental factors as predictors of retention of students classified as *Social Activist* (N = 227) from the first-to-second year of college using SPSS Binary Logistics. Data screening revealed no outliers.

The results of the analysis indicated that the overall model that included

both input and environment factors was statistically reliable in predicting retention (Goodness-of-fit test = 27.33;  $X^2$  (2, N = 227),  $p < .001$ ). The regression coefficients, Wald statistics and odds ratios for the factors in the final model are presented in Table 43.

The factors that were useful for the prediction of first-to second year retention for students classified as *Social Activist* were ethnicity, semester credit hours attempted, and entry-college. Black Non-Hispanic students classified as *Social Activist* were 2.8 times more likely to be retained, with all other factors held constant. The number of semester credit hours attempted had a negative impact on *Social Activist* retention.

**Table 43**

**Model of the Effect of Input and Environmental Factors on Social Activist Student Retention**

	B	S.E.	Wald	df	Sig.	Odds Ratio
Black Non-Hispanic	1.018	.544	3.508	1	.061	2.77
SCH Attempted	-.249	.090	7.636	1	.006	.78
Education	.984	.548	3.227	1	.072	2.68
Liberal & Fine Arts	.799	.379	4.445	1	.035	2.22
Sciences & Engineering	1.302	.391	11.108	1	.001	3.68

For every unit increase in semester credit hours attempted, students classified as *Social Activist* were approximately .78 times as likely to be retained, with all other factors held constant. Students classified as *Social Activist* who enrolled in the college of Liberal and Fine Arts were approximately 2.2 times

more likely to be retained, with all other factors held constant. Students classified as *Social Activist* who enrolled in the college of Education were approximately 2.7 times more likely to be retained, with all other factors held constant. Students classified as *Social Activist* who enrolled in the college of Sciences and Engineering were approximately 3.7 times more likely to be retained, with all other factors held constant. Table 44 shows the classification table for the final *Social Activist* model. The final *Social Activist* model correctly classified 68.3% of all cases.

**Table 44**  
**Classification Table: Social Activist Model**

Observed	Predicted		Percentage Correct
	Retained		
	Non-persistors	Persistor	
Non-persistors	37	47	44.0
Persistor	25	118	82.5
Overall Percentage			68.3

### **Status Striver Model**

A backward stepwise logistic regression analysis was conducted using input and environmental factors as predictors of retention of students classified as *Status Striver* (N = 200) from the first-to-second year of college using SPSS Binary Logistic. Data screening revealed no outliers.

The results of the analysis indicated that the overall model that included both input and environment factors was statistically reliable in predicting

retention (Goodness-of-fit test = 16.27;  $X^2$  (3, N = 200),  $p < .001$ ). The regression coefficients, Wald statistics and odds ratios for the factors in the final model are presented in Table 45.

The factors that were useful for the prediction of first-to second year retention of students classified as *Status Striver* were first semester residence, the number of semester credit hours attempted and entry-college. Students classified as *Status Striver* who lived on-campus were .57 times as likely to be retained as students who lived off-campus, with all other factors held constant. For every unit increase in semester credit hours attempted, students classified as *Status Striver* were approximately .78 times as likely to be retained, with all other factors held constant. Students classified as *Status Striver* who enrolled in the College of Sciences and Engineering were 1.8 times more likely to be retained, with all other factors held constant.

**Table 45**

**Model of the Effect of Input and Environmental Factors on Status Striver Student Retention**

	B	S.E.	Wald	df	Sig.	Odds Ratio
On-campus	-.565	.301	3.527	1	.060	.57
SCH Attempted	-.254	.090	8.052	1	.005	.78
Sciences & Engineering	.588	.323	3.304	1	.069	1.80

Table 46 shows the classification table for the final *Status Striver* model. The final *Status Striver* model correctly classified 65.5% of all cases.



**Table 46****Classification Table: Status Striver Model**

Observed	Predicted		Percentage Correct Non-persistors
	Retained Non-persistors	Persistor	
Non-persistors	38	48	44.2
Persistor	21	93	81.6
Overall Percentage			65.5

**Uncommitted Model**

Backward stepwise logistic regression analysis was conducted using input and environmental factors as predictors of retention of students classified as *Uncommitted* (N = 179), from the first-to-second year of college using SPSS Binary Logistic. Data screening revealed no outliers.

The results of the analysis indicated that the overall model that included both input and environment factors was statistically reliable in predicting retention (Goodness-of-fit test = 8.78;  $\chi^2$  (1, N = 179),  $p < .001$ ). The regression coefficients, Wald statistics and odds ratios for the factors in the final model are presented in Table 47.

**Table 47****Model of the Effect of Input and Environmental Factors on Uncommitted Student Retention**

	B	S.E.	Wald	df	Sig.	Odds Ratio
SCH Attempted	-.257	.089	8.431	1	.004	.77

The only factor that was useful for the prediction of first-to-second year retention of students classified as *Uncommitted* was the number of semester credit hours attempted. For every unit increase in semester credit hours attempted, students classified as *Uncommitted* were approximately .77 times as likely to be retained, with all other factors held constant.

Table 48 shows the classification table for the final *Uncommitted* model. The final *Uncommitted* model correctly classified 60.3% of all cases.

**Table 48**  
**Classification Table: Uncommitted Model**

Observed	Predicted		
	Retained		Percentage Correct
	Non-persistors	Persistor	
Non-persistors	39	41	48.8
Persistor	30	69	69.7
Overall Percentage			60.3

### Summary

The distribution of Astin types was fairly consistent across the sample studied. The most frequent Astin type assigned was *Social Activist* and the least frequent was the *Scholar* type. The examination of the input factors revealed several differences among Astin types. The *Social Activist* type had more females; while the *Scholar* type had more males. The Astin type most frequently observed for White non-Hispanic students was *Hedonist*. The Astin type most

frequently seen for Black non-Hispanic and Hispanic students was *Social Activist*. The Astin type most frequently observed for Asian Pacific Islander students was *Status Striver*. The highest percentage of first generation students was seen in the *Hedonist* and *Uncommitted* types; while the lowest percentage was seen in the *Scholar* and *Leader* types. A higher number of students classified as *Social Activist* and *Status Striver* was observed in the low income category compared to other Astin types. The *Scholar* group had the highest mean SAT score, and *Social Activist* and *Status Striver* had the lowest mean SAT score. With respect to rank in high school class, the bottom and third quartiles had a high percentage of *Hedonist* and the top quartile had a high percentage of *Scholar* and *Leader* types.

The examination of the environment factors revealed several differences between Astin types. Nearly 40% of the students who chose to live on-campus were identified as *Hedonist* or *Social Activist* types. Approximately, 64% of students classified as *Social Activist* chose the Liberal and Fine Arts or the College of Sciences and Engineering as their entry-college. Over 50% of students classified as *Scholars* chose Sciences and Engineering as their entry-college. Approximately, 40% of students identified as *Artist* entered the College of Liberal and Fine Arts. There were no statistically significant differences in the number of semester credit hours and attempted, academic difficulty, and enrollment in a first-year seminar between Astin types. Students classified as *Social Activist* and *Status Striver* accounted for 37% of all SI participants. In

general, there are differences in the first-to-second year in college retention between groups of students classified by Astin Type. *Leaders* and *Scholars* were retained at higher rates than all other Astin types. *Hedonist* students were retained at much lower rates than any other Astin type.

When logistic regression models were conducted using all student participants, it was determined that a model that included both input and environment factors was the best model for prediction of retention. The factors that were valuable for the prediction of first-to-second year retention were ethnicity, rank in high school class, SAT Score, Astin type, first semester residence, entry-college, academic difficulty, credit hours attempted, SI participation, and enrollment in a first-year seminar course.

When logistic regression models that included both input and environment factors were conducted for each Astin type, environmental factors were more useful for the prediction of retention. Table 49 shows that odds ratios for each of the statistically significant factors for the prediction of retention for each Astin type. Semester credit hours attempted was significant for all Astin types. A higher number of semester credit hours attempted was related to a lower likelihood of retention from the first-to-second year.

**Table 49****Likelihood of Retention, by Astin Type (Odds Ratios)**

	Artist	Hedonist	Leader	Scholar	Social Activist	Status Striver	Un- committed
<b>Input Factors</b>							
<i>Gender</i>							
Male	.52	1.83					
<i>Ethnicity</i>							
Black Non Hispanic					2.77		
<i>Financial Need</i>							
Low income			.20*				
<i>Rank in HS Class</i>							
Bottom Quartile			.09*				
Third Quartile	.23*		.16*				
<b>Environment Factors</b>							
Live On-campus						.57	
<i>Entry-College</i>							
Business		2.71*					
Education					2.68		
Liberal & Fine Arts				.29	2.22*		
Sciences & Engineering					3.68**	1.80	
Academic Difficulty	.05**	.06***	.09**				
SCH Attempted	.82*	.79**	.66***	.68**	.78**	.78***	.77**
SI Participation		3.39***					

\* p<.05 \*\* p<.01 \*\*\* p<.001

Three input factors were useful for predicting the retention of at least one Astin type. Gender was a significant predictor for two Astin types, *Artist* and *Hedonist*. Male students classified as *Artist* were less likely to be retained than their female peers; while male students classified as *Hedonist* were more likely to be retained than their female peers. Black non-Hispanic *Social Activist* students were nearly three times as likely to be retained as their White non-Hispanic peers. Financial need was predictive of retention for students who were classified as *Leader* only; where low income students were less likely to be

retained than peers who did not apply for financial aid. Rank in high school class was predictive only for *Artist* and *Leader* types. *Artists* ranked in the third high school quartile were less likely to be retained; while *Leaders* ranked in the third and bottom quartiles were less likely to be retained.

Five environmental factors were useful for predicting the retention of at least one Astin type. Living on-campus was predictive for *Social Activist*, where living students living on-campus were less likely to be retained than peers living off-campus. Choice of entry-college was valuable to the prediction of retention for three Astin types-- Hedonist, Social Activist, and Status Striver. Students classified as *Hedonist* who enrolled in Business were more likely to be retained. Students classified as *Social Activist* who enrolled in Education, Liberal and Fine Arts, or Sciences and Engineering were more likely to be retained. Students classified as *Status Striver* who enrolled in Sciences and Engineering were more likely to be retained. Supplemental Instruction was a significant predictor of students classified as *Hedonist*. Students classified as *Hedonist* who participated in SI were three times more likely to be retained than their peers who did not attend SI.

## CHAPTER V

### SUMMARY AND CONCLUSIONS

The impetus for this study was a desire to better understand the factors that impact student retention from the first-to-second year of college at a large Hispanic Serving Institution. College and university enrollment is continuing to grow; however, the rates of student retention and graduation have remained unchanged over the past 30 years. To address these issues, higher education institutions have employed various academic support programs, often at great cost, with a goal to make a positive impact on retention rates. Frequently these programs are implemented without empirical evidence as to whether the adopted programs are effective within the specific institutional context or among student populations served by the institution.

Empirical evidence provided by this study can be used to (a) bolster institutional support for effective academic support programs; (b) inform students, parents, and educators about the factors that impact retention; (c) advance our understanding of Astin types and the characteristics that define them, (d) further our understanding of the influence that various academic disciplines have on student retention, and (e) foster the development of more sophisticated 'early identification' programs to promote student retention from the first-to-second year of college.

The review of literature in Chapter II provided the basis for selecting the factors used in this study. Although many of the relationships among the

retention factors have been widely studied; the results of these previous studies often differ in their findings (Hendel, 2006; Leppel, 2002; McGrath & Braunstein, 1997; Sidle & McReynolds, 1999). These contradictory findings confound the work of educational practitioners and policy-makers who attempt to promote student persistence within their respective institutional contexts. Research located within a single institution is the best means to acquire empirical evidence to support decision-making within limited resource environment; therefore this study was conducted at a single institution.

Over the course of the past 40 years, several college student typologies (Clark & Trow, 1966; Hackman & Taber, 1979; Horowitz, 1987; Katchadourian & Boli, 1985; Keniston, 1973; Kuh, Hu, & Vesper, 2000; Newcomb, Koenig, Flacks, & Warwick, 1967) such as the one developed by Alexander Astin have been developed to better understand various nuances related to diverse college student populations. The Astin (1993b) typology can be used to classify students based on their responses to items contained in the *Cooperative Institutional Research Program (CIRP) Freshman Survey* that is typically administered at a student's initial entry into a college or university. The seven Astin types articulated in his model include: Artist, Hedonist, Leader, Scholar, Social Activist, Status Striver, and Uncommitted. Although the Astin typology has provided a comprehensive description of college students, its use has been limited in the area of retention research, and predictive model analyses using this particular typology have been rare. This study used Astin typology to categorize first-year



students into groups based on their values, attitudes, beliefs, self-concept, and behaviors and to establish whether these groups are useful for the prediction of retention from the first-to-second year of college.

The purpose of this study was to identify how input and environmental factors impact first-to-second year retention of undergraduate students at a large Hispanic Serving Institution. An additional purpose of the study was to determine the efficacy of Astin types as predictive factors in better understanding student retention.

### **Research Questions**

The following research questions were addressed in this study:

1. To what extent do the pre-entry (input) factors (SAT scores, rank in high school class, gender, ethnicity, first-generation status, financial need and Astin type derived from the *Cooperative Institutional Research Program (CIRP) Freshman Survey*) predict retention (output) of selected undergraduate students at the University of Texas at San Antonio?
2. To what extent do Astin type (input) and post-entry (environmental) factors (first-semester residence, entry college, semester credit hours attempted, academic course difficulty, participation in Supplemental Instruction, and enrollment in a first-year seminar course) impact retention (output) of selected undergraduate students at the University of Texas at San Antonio?
3. To what extent does the combination of pre-entry factors (inputs), post-entry factors (environmental) impact selected undergraduate student retention

(output) of freshmen at the University of Texas at San Antonio?

4. To what extent does the combination of pre-entry factors (inputs), post-entry factors (environmental) impact the retention of students identified as a particular Astin type at the University of Texas at San Antonio?

This chapter is organized into four sections (a) summary of the methodology, (b) summary of the findings and conclusions, (c) recommendations for the field, and (d) recommendations for research.

### **Research Methodology**

The population for this study included students who were first-time-enrolled-in-college freshmen at the University of Texas at San Antonio for the Fall 2002, 2003, 2004 semesters. The study utilized three existing databases: (a) *CIRP: Freshman Survey* that included all the student responses; (b) student information system (BANNER) that included admission, academic, demographic, and personal information for each student enrolled at the University; and (c) Supplemental Instruction (SI) that included student SI participation data.

The dependent variable was retention from the first-to-second year of enrollment at the University. The predictive factors included Astin type, gender, ethnicity, first generation status, financial need, rank in high school class, SAT score, first semester residence, choice of entry-college, semester credit hours attempted, academic difficulty, participation in SI, and enrollment in a first-year seminar course.

The study used both descriptive and univariate statistics to describe the sample population, as well as the similarities and differences found to exist among the seven Astin types. Preliminary data analyses were performed to ascertain whether significant differences existed between the sample population and the overall first-year student population with respect to the demographic factors included in the study. The result of these analyses revealed no significant differences between student participants and the overall first-year student population based on gender, ethnicity, first generation status, family income, and SAT scores. However, the analyses revealed that the sample population had an over-representation of first generation students and students ranked in the top quartile of their high school graduating classes. As a consequence, the results associated with these two factors may not be representative of the overall first-year student population at this University and thus may limit the generalizability of the univariate results associated with these factors to the overall first-year student population. However, this limitation to the generalizability of the study was addressed through the use of multivariate analyses (logistic regression), which controls for these differences.

### **Summary of Findings and Conclusions**

Several patterns emerged from the analyses structured to compare differences among Astin types with respect to the input factors included in the study. *Social Activist* was the most frequent Astin type represented in the sample population; while *Scholar* was the least frequent Astin type represented

in the sample population. These findings are inconsistent with previous research that identified Scholar as the most common type (Astin, 1993b; Luo & Jaimeson-Drake, 2005). This contradictory finding may be related to the somewhat open-ended admission policies (based on SAT scores and rank in high school class) of the institution studied compared to the institutions which have been studied previously. Perhaps at the University, this level of admissions policy increases the proportion of students who are less confident in their academic abilities, which characterizes the *Scholar* type.

### *Univariate Analyses of Astin Types*

#### **Input Factors**

##### *Gender*

Overall, the analysis of gender and Astin type was consistent with previous research. The analysis of gender revealed that female students comprised a higher proportion of the *Social Activist* population, which supports previous research that identified a high proportion of female students as *Social Activist* (Miller, 2004). A higher proportion of male students were identified as *Scholar* and *Hedonist*, a result consistent with the research reviewed in Chapter II that identified a similar pattern for male students (Luo & Jaimeson-Drake, 2005).

##### *Ethnicity*

Overall, the analysis of ethnicity and Astin type was consistent with previous research. A high proportion of Hispanic students were classified as

*Social Activist*, which is supported by previous research that observed a similar pattern (Astin, 1993b). Hence, this finding is not atypical for an institution with a Hispanic student enrollment greater than 40%. Further, the analyses of ethnicity revealed that a high proportion of Hispanic students were identified as *Leader*, which is inconsistent with the literature reviewed in Chapter II. A result that may well be associated with the University being a HSI. Since the *Leader* type is characterized by an individual possessing self-confidence and public speaking ability; perhaps Hispanic students who possess these qualities consider a HSI as an environment that provides a greater number of opportunities for them to excel. A low proportion of Black non-Hispanic students were classified as *Hedonist*, which is consistent with the research reviewed in Chapter II that identified a low proportion of Black non-Hispanic students as being classified as *Hedonist* (Astin, 1993b; Luo & Jaimeson-Drake, 2005). On the other hand, a high proportion of White non-Hispanic students were classified as *Hedonist* or *Uncommitted* and a high proportion of Asian Pacific Islander students were classified as *Status Striver* or *Uncommitted*—findings supported by the research of Luo and Jaimeson-Drake (2005).

#### *First-generation Status*

The analyses of first-generation status and Astin type revealed that first generation students were less likely to be classified as *Hedonist* or *Uncommitted* types. A finding that may potentially indicate that first generation students are more purposeful in their reasons for attending college and are less likely to

engage in social behaviors (e.g. partying). However, further research is needed to better understand these results.

#### *Financial Need*

The analysis of family income and Astin type revealed that students from families in the lowest income category were more likely to be classified as *Social Activist* or *Status Striver*. This result is inconsistent with previous research that found a high proportion of low income students to be classified as *Artist* (Miller, 2004) or *Uncommitted* (Luo & Jaimeson-Drake, 2005). Some context for this result potentially exists in the research by Astin (1993b) that found students classified as *Social Activist* to have more concerns about their ability to pay for college. Previous research does not show a high proportion of low income students in the *Status Striver* type. Since this type is characterized by the individual possessing future goals such as owning one's own business or being well-off financially; perhaps *Status Striver* students see higher education as a means of developing career skills in order to improve their economic future. Another possible explanation is supported by the research of Luo and Jaimeson-Drake (2005) that observed a primary reason for *Status Striver* students to attend college was parental encouragement. However, further research is needed to better understand these results.

#### *SAT Score and Rank in High School Class*

In general, the analyses of the academic achievement factors of SAT score and rank in high school class among the Astin types were consistent with

previous research. Students classified as *Scholar* tended to have higher SAT scores and high school performance compared to other Astin types-- a result that aligns with the given academic focus that characterize the *Scholar* type. Furthermore, students classified as *Hedonist* tended to be ranked lower in their high school graduating class; however, their SAT scores were not significantly different from the other Astin types. Results that potentially serve as an indicator *Hedonist* are less likely to apply themselves in the classroom, but are otherwise academically capable.

### **Environment Factors**

Several patterns emerged from the analyses that compared differences among Astin types with respect to the environmental factors included in the study. The analyses of academic difficulty, semester credit hours attempted, and enrollment in a first-year seminar course did not reveal significant differences among the Astin types. However, the analyses of first-semester residence, choice of entry-college, and participation in SI did reveal differences among the Astin types.

#### *First Semester Residence*

Notably, a high proportion of on-campus residents were classified as *Hedonist* or *Uncommitted* types. Conceivably, students classified as *Hedonist* perceive living on-campus as a means to connect with the social environment in order to engage in partying behaviors. Conversely, perhaps students classified as *Uncommitted*, who are more likely to be unsure of their reasons for attending

college, view living on-campus as a means to engage with the academic environment. However, further research is needed to better understand these results.

### *Choice of Entry-College*

The analysis of the choice of entry-college among the Astin types was consistent with the observations in previous research (Astin, 1993b). Students classified as *Artist* were more likely to choose Liberal and Fine Arts, which provides opportunities to develop their artistic skills that define this Astin type. Students classified as *Leader* did not demonstrate a preference for a particular entry-college; however, they were less likely to be undecided with respect to major. Since *Leader* is characterized by the individual being highly self-confident (rather than having specific future goals); perhaps, their high level of self-confidence encourages *Leaders* to choose a major that is congruent with their interests rather than for a particular career. Students classified as *Scholars* tended to enroll in Sciences and Engineering, which closely aligns with their demonstrated academic ability (i.e. rank in high school class and SAT scores) are well-suited for these challenging majors. Students classified as *Status Striver* tended to choose Business or Sciences and Engineering as their entry-college. Business provides the opportunity to develop the administrative and entrepreneurial skills that characterize the *Status Striver* type. Perhaps, students classified as *Status Striver* consider careers in Sciences and Engineering as a means to be recognized for their contributions in their field. Students classified



as *Social Activist* tended to choose Education or Liberal and Fine Arts as their entry-college. This Astin type is characterized by the individual having goals to influence political and social structure. Perhaps, *Social Activist* who chose Education do so based on a belief that education is a way to influence the society-at-large; while *Social Activist* who chose Liberal and Fine Arts pursue majors such as Political Science and Sociology as a means to do so.

*Uncommitted* or *Hedonist* types were more likely to be undecided with respect to major. This finding may indicate that these students want to test the academic waters before committing to a particular educational goal.

#### *Supplemental Instruction (SI) Participation*

The analysis of SI participation revealed differences among the Astin types. Students classified as *Social Activist* or *Uncommitted* were more likely to participate in SI, which may be a potential indication of their commitment achieving academically. Since the *Uncommitted* student type is characterized by the individual being unsure of their educational goals; perhaps *Uncommitted* students hold a perception that SI provides a means to strengthen their integration into the University. Since the characteristics that identify the *Social Activist* include a desire to help others and participation in the community; perhaps these students perceive SI as an opportunity to do both. On the other hand, students classified as *Hedonist* were less likely to participate in SI, which may be an indication of their lack of commitment to educational pursuits.

### *Logistic Regression Models*

Three separate logistic regression analyses organized by Astin's I-E-O framework were conducted in order to develop a model predictive of retention from the first-to-second year of college. The first model (Inputs only) included Astin type and other input factors such as demographic factors (e.g. gender, ethnicity etc.) and prior educational achievement factors (SAT score and rank in high school class). The second model (Environmental factors) included Astin type and environment factors such as semester credit hours attempted, choice of entry-college, etc. The third model (Inputs and Environmental factors) included Astin type with all input and environmental factors.

The predictive accuracy of each model was assessed through its ability to correctly classify student participants as persistors, those students who returned for their second year at the University or as non-persistors, those students who did not return for their second year at the University. Subsequent analyses were conducted to identify the specific factors that were useful for predicting retention for each of the seven Astin types.

#### **Research Question One**

*To what extent do gender, ethnicity, first-generation status, financial need, SAT scores, rank in high school class, and Astin type predict retention of selected undergraduate students at the University of Texas at San Antonio?*

Backward logistic regression analysis was used to answer this question and to determine the efficacy of an inputs only model for predicting retention.

The analysis of the inputs only model showed that ethnicity, rank in high school class, and Astin type were useful factors for the prediction of retention from the first-to-second year of college. While, first generation status, financial need, SAT score were not useful for the prediction of retention in the inputs only model. The exclusion of first generation status and financial need in the inputs only model was unexpected given the frequent findings that show these factors correspond to an increased risk of attrition (Braunstein, McGrath, & Pescatrice, 2000; Choy, 2000; Horn & Nunez, 2000; Ishitani, 2006; Nunez & Cuccaro-Alamin, 1998; St. John, Paulsen, & Carter, 2005; Wohlgemuth, Whalen, Sullivan, Nadig, Shelley, & Wang, 2006).

Using only input factors as predictors, the odds of retention for Hispanic students were increased by 36% compared to White non-Hispanic students, with all other factors being controlled. Although a possible explanation for this difference is not readily apparent, but it does indicate Hispanic students were more likely to be retained at the time of matriculation. The odds retention of Black non-Hispanic and Asian Pacific Islander students was not significantly different from White non-Hispanic students in the inputs only model.

A lower rank in high school class translated to a higher risk of attrition; where the odds of retention were decreased by 30-40% for students who were not ranked in the top quartile of their high school graduating class. Therefore, high school performance provides some indication of a student's risk of attrition. This finding is consistent with research reviewed in Chapter II (Hendel, 2006;

Ishitani, 2006) that found a lower rank in high school class relates to an increased risk of attrition.

Only three Astin types were useful for the prediction of retention in the inputs only model, namely *Hedonist*, *Status Striver*, and *Uncommitted* types. These three Astin types demonstrated a higher risk of attrition when compared to the *Scholar* type that had the highest retention rate, when all other input factors were controlled. The odds of retention for the *Hedonist* type were decreased by 52%, compared to the *Scholar* type. The odds of retention for the *Status Striver* and *Uncommitted* types were decreased by approximately 40% compared to the *Scholar* type. The odds of retention for the remaining Astin types (*Artist*, *Leader*, and *Social Activist*) were not significantly different from that of the *Scholar* type.

The predictive accuracy of the input only model was marginal, which indicates the limited usefulness of the inputs only model for the prediction of retention. This finding potentially signifies that this model that relies solely upon input factors is not a reliable tool for the prediction of retention at the University. Therefore, the next analysis was conducted to determine whether a model that included only environmental factors would provide a more accurate prediction model.

## **Research Question Two**

*To what extent do Astin type, first-semester residence, entry-college, semester credit hours attempted, academic course difficulty, participation in SI,*

*and enrollment in a first-year seminar course impact retention of selected undergraduate students at the University of Texas at San Antonio?* Backward logistic regression analysis was used to answer this question and to determine the efficacy of an environment model for the prediction of retention from the first-to-second year of college at the University.

The data analysis of the environment model indicated that all the environmental factors included in the study were useful for the prediction of retention from the first-to-second year of college. As was observed in the inputs only model, *Hedonist*, *Status Striver*, and *Uncommitted* types exhibited a significant decrease in the odds of retention, compared to the *Scholar* type, through the environment model. The remaining Astin types (*Artist*, *Leader*, and *Social Activist*) were not useful as factors for the prediction of retention.

The odds of retention for the *Hedonist* type were decreased by 56% compared to the *Scholar* type. The odds of retention for the *Status Striver*, and *Uncommitted* types were decreased by 38% compared to the *Scholar* type. Results potentially indicate that *Hedonist*, *Status Striver*, and *Uncommitted* students exhibit a higher risk of attrition notwithstanding the factors in their environment.

The odds of retention were decreased by 26% for students who chose to live on-campus. This result is inconsistent with the research reviewed in Chapter II that found living on-campus to have a positive impact on retention (Astin, 1973; Astin, 2001; Chickering, 1974; Galicki & McEwen, 1989; Herndon, 1984;

Lewallen, 1993; Thompson, Samiratedu, & Rafter, 1993) This inconsistency may be attributable to the fact that the University is largely a commuter institution, where a mere 10% of the entire student population lives on-campus. Perhaps, institutions that have a larger residential population than the institution studied also have more fully developed student life and residence life programs that promote residential student persistence. However, further research is needed to better understand these results.

In the environmental factor model, three factors had a positive impact on first-to-second year retention—choosing the Sciences and Engineering as the entry-college, participating in SI, and enrolling in a first-year seminar course. The odds of retention were increased by 66% for students who chose Sciences and Engineering as their entry-college. A possible explanation for this finding may be due to the number of Science and Engineering students classified as *Scholar*, the Astin type with the highest retention rate. The odds of retention for students who participated in SI were increased by 53% compared to students who did not participate. This finding is consistent with research reviewed in Chapter II that revealed that SI exerted a positive influence on retention (Hensen & Shelley, 2003; Ogden, Thompson, & Russell, 2003; Ramirez, 1997). The odds of retention for students who enrolled in a first-year seminar course were increased by 70% compared to students who did not enroll. This finding is consistent with previous research that revealed how seminar course enrollment exerted a

positive impact on retention (Starke, Harth, & Sirianni, 2001; Yockey & George, 1998).

Both semester credit hours attempted and academic difficulty factors had a negative impact on first-to-second year retention. However, this finding should be interpreted cautiously since the environment factor model does not control for input factors related to educational preparation (i.e. SAT score, rank in high school class).

The environmental model was better able to predict retention than the input model, which demonstrates the increased worth of the environmental factors in comparison to input factors for predicting retention. However, the environment model does not control for pre-entry characteristics such as rank in high school class or financial need. This potential limitation of the environmental model was addressed in the subsequent analysis to determine whether these results held true when input factors were controlled.

### **Research Question Three**

*To what extent do Astin type, gender, ethnicity, first-generation status, financial need, SAT scores, rank in high school class, first-semester residence, entry-college, semester credit hours attempted, academic course difficulty, participation in SI, and enrollment in a first-year seminar course impact retention of selected undergraduate students at the University of Texas at San Antonio?*

Backward logistic regression analysis was used to answer this question and to determine the efficacy of a model that included both input and environmental

factors to predict retention.

The analysis of the input and environmental factors model revealed that Astin type, ethnicity, rank in high school class, first-semester residence, semester credit hours attempted, academic course difficulty, participation in SI, and enrollment in a first-year seminar course were useful for the prediction of retention from the first to the second year of college; while gender, first-generation status, financial need, SAT scores, and choice of entry-college were not useful for the prediction of retention from the first-to-second year of college.

As in the two previous models, the Astin types of *Hedonist*, *Status Striver*, and *Uncommitted* showed a decrease in the odds of retention compared to the *Scholar* type. Thus, students who were classified as *Hedonist*, *Status Striver*, and *Uncommitted* were less likely to be retained at this institution when all other input and environmental factors were controlled.

The odds of retention for the *Hedonist* and *Uncommitted* types were decreased by 52% and 40% respectively compared to the *Scholar* type, with all other factors controlled. The odds of retention for the *Status Striver* were decreased by 33% compared to the *Scholar* type, with all other factors controlled. The possible explanations for the decrease in the odds of retention may be different for each of these student types. For example, *Hedonist* students might be more likely to continue to engage in the “partying” behaviors that they engaged in while in high school, which ultimately have a negative effect on their persistence to the second year. As observed in the univariate analyses,



*Uncommitted* students were more likely to be undecided majors, which may be an indication that they are unsure of their reasons for attending college. The lack of a clear reason of attending may limit their commitment to the goal of graduation, and this lack of commitment may be detrimental to their continued enrollment. A high proportion of the *Status Striver* type was observed in the low income and first generation student categories. Perhaps, the *Status Striver* type is serving as a proxy for these two factors, which have consistently been shown to place students at a higher risk of attrition. Another possible explanation is that students with high financial need may be more likely to work in order to meet educational and living expenses, which has a detrimental impact on their continued enrollment.

In the model that included both input and environmental factors, the odds of retention were significantly higher for Hispanic and Black non-Hispanic students. The odds of retention for Hispanic students were increased by 25%, with all other factors being controlled. In the model that included both input and environmental factors, the odds of retention for Black non-Hispanic students were increased by 58%, with all other factors being controlled. These findings potentially indicate that students from under-represented populations who enroll at an HSI have more opportunities to develop support structures that facilitate their integration into higher education, which promotes their return for the second year of enrollment at the University.

In the model that included both input and environmental factors, a lower

rank in high school class was related to a higher risk of attrition; where the odds of retention were decreased by 30-40% for students who were not in the top quartile of their graduating class. This result is consistent with previous research that has found high school rank to be a significant predictor of retention (Hendel, 2006; Ishitani, 2006). The impact of lower rank in high school class is the similar to the findings in the inputs only model, which may indicate that environmental factors hold little influence over the retention of students with a lower rank in their high school graduating class.

In the model that included both input and environmental factors, choosing to live on-campus was related to a higher risk of attrition; where the odds of retention were decreased by 24% for students who chose to live on-campus. Therefore, even when controlling for input factors, living on-campus lowered the odds of a student returning for their second year at the University. Again, this result is inconsistent with previous research that has shown that living on-campus to have a positive impact on retention (Astin, 1973; Astin, 2001; Chickering, 1974; Galicki & McEwen, 1989; Herndon, 1984; Lewallen, 1993; Thompson, Samiratedu, & Rafter, 1993). As stated previously, the University is largely a commuter institution that may not have fully developed structures to support on-campus student retention. In addition, a high proportion of on-campus residents were classified as *Hedonist* and *Uncommitted* types, which may indicate the existence of an interaction between these factors. Thus, a second possible explanation may be that students who live on-campus are more

likely to connect to some negative social aspects of the college environment that may ultimately impede their returning for the second year of college at the University as opposed to students who live off-campus. Perhaps, students who live off-campus and therefore have to travel some distance to campus are less likely to engage with their peers through the social aspects of the campus, i.e. they are more likely to attend class and leave afterwards; while students who live on-campus have more opportunities to engage with their peers through the social aspects of the campus context. However, further research is needed to better understand the underlying causes for these findings.

In the model that included both input and environmental factors, both semester credit hours attempted and academic difficulty factors had a negative impact on first-to-second year retention was similar to that observed in the environmental factor model. Thus, more semester credit hours attempted and higher academic difficulty lowered the odds of a student returning to the University for a second year when controlling for input factors associated with previous educational achievement. Previous research (DesJardins, Kim, & Rzonca, 2002; Volkwein & Lorang, 1996) found a positive relationship between enrolling in higher number of credit hours and retention; while other research (Bean & Bradley, 1986; Pike, 1991) found an inverse relationship between course difficulty and retention to exist. Perhaps, at this institution students who attempted more semester credit hours or enrolled in more difficult courses were unable to balance their academic course requirements with other demands on

their time such as work or familial responsibilities. However, further research is needed to better understand the underlying causes for these findings.

In the model that included input and environmental factors, participating in SI and enrolling in a first-year seminar course had a positive impact on first-to-second year retention. The odds of retention for students who participated in SI were increased by nearly 60% compared to students who did not participate. Again, this finding is consistent with previous research that SI has a positive impact on retention. The odds of retention for students who enrolled in a first-year seminar course were increased by over 80% compared to students who did not enroll in a first-year seminar course. This finding is consistent with previous research that seminar courses have a positive impact on retention (Pascarella & Terenzini, 2005; Sidle & McReynolds, 1999; Yockey & George, 1998).

The input and environment model was better able to predict retention than the other two models. Consequently, separate analyses based on the input and environmental factor model were conducted to determine the impact that specific factors have on the retention for each of the seven Astin types.

#### **Research Question Four**

*To what extent does the combination of pre-entry factors (inputs), post-entry factors (environmental) impact the retention of students identified as a particular Astin type at the University of Texas at San Antonio?* Backward logistic regression analysis was used to answer this question and to determine

the efficacy of each model that included both input and environmental factors to predict retention for each of the seven Astin types.

#### *Artist Model*

Gender and rank in high school class were the only input factors that were found to be useful for prediction of *Artist* student retention. Male students identified as *Artist* were one-half as likely to be retained as their female peers. As male students comprise a smaller proportion of the *Artist* population, perhaps males have fewer opportunities to connect with male peers with similar goals and interests, which may decrease their level of satisfaction, institutional commitment, which has a negative impact on their persistence. Students identified as *Artist* who were ranked in the third quartile of their high school graduating class were less likely to be retained than their peers who were ranked in the top quartile of their high school graduating class, which is consistent with previous research (Hendel, 2006) that found lower high school rank related to a higher risk of attrition.

Two environmental factors were useful for the prediction of *Artist* student retention—semester credit hours attempted and academic course difficulty. Students identified as *Artist* who attempted more semester credit hours or more difficult courses were less likely to be retained.

#### *Hedonist Model*

Gender was the only input factor that was found to be useful for prediction of *Hedonist* student retention. Male students identified as *Hedonist* were more

likely to be retained as their female peers. Since this type is characterized by the individual engaging in partying behaviors; perhaps female *Hedonist* are more susceptible to the potential negative influences that these behaviors may have on persistence than their male peers.

Four environmental factors were useful for the prediction of *Hedonist* student retention—choosing Business as their entry-college, semester credit hours attempted, academic course difficulty and participation in SI. The odds of retention were significantly increased for *Hedonist* who chose Business as their entry-college. Perhaps the environment in Business provides *Hedonist* students more opportunities to develop positive relationships through interactions with peers and faculty, which promotes their retention for the first-to-second year of college. Students identified as *Hedonist* who attempted more semester credit hours or more difficult courses were less likely to be retained. Students classified as the *Hedonist* type were more likely to attempt a high level of academic difficulty and were less likely to attend SI. Most notably, the odds of retention for students classified as *Hedonist* and participated in SI were three times higher than those who did not participate. Perhaps, students classified as *Hedonist* who participate in SI are able to develop their study skills through participation, as well as form an effective academic support structure via the group format typically found to exist in SI structures.

### *Leader Model*

Financial need and rank in high school class were the only input factors that were found to be useful for prediction of *Leader* student retention. Students identified as *Leader* with high financial need were less likely to be retained than their peers who did not apply for financial aid. Although, the *Leader* type exhibited the second highest retention rate; perhaps, *Leaders* who come from a low income background have to work, which decreases their opportunities to engage with the University environment fully. *Leader* students who were ranked in the bottom and third quartiles of their high school graduating class were less likely to be retained than their peers who were ranked in the top quartile of their high school graduating class.

Two environmental factors were useful for the prediction of *Leader* student retention—semester credit hours attempted and academic course difficulty. Semester credit hours attempted has a significant negative impact in the retention of students classified as *Leader*. Since self-confidence characterizes this Astin type, this finding may indicate that this trait may lead students classified as *Leader* to attempt more semester credit hours than they should. Academic course difficulty had a significant negative impact in the odds of retention for students identified as *Leader*. These results may indicate that students who are classified as *Leader* may under-estimate the increased academic expectations found in the higher education setting and overestimate their preparedness to meet these expectations, which leads them to attempt

more difficult courses than they are capable of successfully completing.

#### *Scholar Model*

Two environmental factors were useful for the prediction of *Scholar* student retention—semester credit hours attempted and choosing Liberal and Fine Arts as their entry-college. Semester credit hours attempted had a significant negative impact in the retention of students classified as *Scholar*. Since previous educational success defines this Astin type, this finding may indicate that these traits may lead students classified as *Scholar* to attempt more semester credit hours than they should. The odds of retention for students identified as *Scholar* who chose to enroll in the College of Liberal and Fine Arts were decreased, which may indicate that the Liberal and Fine Arts environment is not congruent with the expectations of these students. However, further research is needed to better understand these results.

#### *Social Activist Model*

Ethnicity was the only input factor that was found to be useful for prediction of *Social Activist* student retention. Black non-Hispanic students identified as *Social Activist* were more likely to be retained. This finding may indicate that the environment provided at the University affords Black non-Hispanic students opportunities that are congruent with the personal goals that characterize this Astin type such as helping others, and influencing political and social structures.

Two environmental factors were useful for the prediction of *Social Activist*



student retention—semester credit hours attempted and choice of entry-college. Semester credit hours attempted had a significant negative impact in the retention of students classified as *Social Activist*. The odds of retention were significantly increased for *Social Activist* who chose Education, Liberal and Fine Arts, and Sciences and Engineering as their entry-college. Since this type is characterized by the individual possessing future goals such as helping others, and influencing social structures; perhaps *Social Activist* students find the academic environment that exists in these Colleges is congruent with their goals and expectations.

#### *Status Striver Model*

None of the input factors included in this study were useful for the prediction of *Status Striver* student retention. Two environmental factors were useful for the prediction of *Status Striver* student retention—semester credit hours attempted and choice of entry-college. Semester credit hours attempted had a significant negative impact in the retention of students classified as *Status Striver*. A high proportion of low income students were identified as *Status Striver*; perhaps many of these students work in addition to attending the University, which decreases the amount of time they can devote to their education. The odds of retention were significantly increased for *Status Striver* students who chose Sciences and Engineering as their entry-college. Since this type is characterized by the individual possessing future goals such as being an authority in their field, obtaining recognition, and financial well-being; perhaps

*Status Striver* students find Sciences and Engineering to be an environment is congruent with and supportive of their aspirations.

#### *Uncommitted Model*

Semester credit hours attempted was the sole factor that was found to be useful for prediction of *Uncommitted* student retention. A high proportion of students identified as *Uncommitted* were classified as 'Undecided' majors. Since this Astin type is characterized by an individual being uncertain of their educational goals, perhaps being *Uncommitted* serves as a strong indicator that these students are at risk of attrition because of this uncertainty. Conceivably, the lack of a clear educational goal is so detrimental to a students persisting to the second year of college at the University that no other factors hold any influence over their likelihood of persisting.

#### *Summary*

There were several notable results from the analyses for each Astin type. Overall, environmental factors were more useful for predicting retention than input factors. For example, semester credit hours attempted was consistently found to have a negative influence for all Astin Types. It is also interesting to note those factors that had little value in the prediction of retention rates among Astin types. It was unexpected that first generation status would not be a significant predictor in any of the models developed in this study. In addition, it was unexpected, that high financial need (low income) would be a significant predictor in only one model (*Leader*). These findings are inconsistent with much

of the previous research that has shown first generation status and high financial need to have a negative impact on retention (Choy, 2001; Horn & Kojaku, 2001). Perhaps, the high proportion of first-generation students enrolled at this institution acts as an attenuating factor of these risks, because so many first-generation students have peers who are also first-generation students. SAT scores were not useful for predicting retention of any Astin type, which provides further evidence that standardized test scores have limited value in the prediction of retention (Hendel, 2006; Schwartz & Washington, 2002).

### **Recommendations for the Field**

This study provides empirical evidence that can be acted upon by educational administrators in an array of areas including university orientation, academic advising, and retention programs.

1. The University should develop and implement a mandatory first-year student survey using items derived from the CIRP: Freshman Survey as part of the admission and pre-orientation processes for first-year students.
2. The information derived from the first-year student survey would assist academic advisors in making recommendations to their advisees in the initial advising session. Apparently, the pressure to graduate students in the shortest timeframe as possible has created an environment in which students are encouraged to enroll in more semester credit hours than is often prudent. Perhaps, advisors place too much value on test scores and high school achievement in making their recommendations to incoming first-year

students. This study provided evidence that semester hours attempted and academic course difficulty have an inverse relationship with retention—regardless of previous academic performance (i.e. SAT score, rank in high school class).

3. The university should make the difficulty level of academic courses more public. This policy would allow students and their advisors to make better choices in building an appropriate first semester course schedule.
4. The information derived from the first-year student survey would provide an overview of the attitudes, expectations, behaviors, and values of the incoming first-year student class that could be used by both faculty and student affairs personnel. Faculty could use the information to tailor courses to appeal to student interests. For example, a faculty member could integrate a discussion about choosing a major or career path into a course that enrolled a high proportion students classified as *Uncommitted*. Student affairs personnel could use the information to design specific programs for at-risk students such as mentoring or other support programs for *Hedonist* students.
5. The positive influence that SI and first-year seminar have on the persistence of students at a higher risk of attrition should be more broadly communicated to students. At present, the messages about SI are general statements, which based on the results of this study; fail to connect with *Hedonist* students (based on the low rate of participation) who gain the most benefit

when they participate. A communication plan should be developed that is targeted toward students classified as *Hedonist* so as to persuade more of these at-risk students to participate in the program and thereby improve their odds of returning for the second year of college. One approach might be to have *Hedonist* student “survivors” who realized a benefit from the program to share their experience with future classes of incoming first-year students.

6. The university should consider extending the first-year seminar courses to all incoming first-year students. A significant investment that may well be offset by the gains in tuition dollars realized through the continued enrollment of more students.
7. Enhanced communication between faculty, staff, and institutional researchers is also needed to promote an increase in the overall retention rate of the university. There are very few forums that cut across divisional lines; the development of these opportunities to discuss and contemplate new approaches to promoting student persistence will be a key to the university realizing increased retention and graduation rates. Another approach might be a website or listserv that keeps the entire campus community apprised of retention efforts and research findings.

### **Recommendations for Research**

This study provides a basis for several directions for future research in an array of areas such as research at this university, research at other institutions, and research designed to develop a better understanding of the Astin typology.

1. This study should be replicated at this university and at other Hispanic Serving Institutions to cross-validate the models developed in this study. Findings of consistent patterns across years and institutions would provide support for the models developed. In addition, findings in future studies at other institutions would also provide additional insight into the differences between institutional contexts.
2. Further research into factors that impact retention at this institution should be conducted. This research should include additional input factors (e.g. reasons for attending, distance from home, and self-efficacy, etc.) and additional environmental factors (e.g. semester GPA, amount of time spent working, interaction with faculty etc.).
3. Also, this research should consider the influence that participation in other campus activities (e.g. clubs, organizations, recreation and wellness, etc.) may have on the retention of on-campus and commuter student populations.
4. In particular, further research into the influence that living on-campus has on retention is warranted at this institution. For example, this study did not consider whether differences may exist among various on-campus residential living arrangements i.e. on-campus apartments v. residence halls and retention. Also, this research should examine the effectiveness of the residential student programs offered in support increased persistence and retention.

5. In addition, a longitudinal study that considers the relationship between the factors studied and persistence through to graduation is an obvious extension of this study.
6. Furthermore, the perspectives of faculty and staff would provide another perspective into retention, which could be used to identify other factors that influence student persistence at the institution. Faculty perceptions of student behaviors such as class participation and interactions outside of the classroom may provide a better understanding of the characteristics that describe a 'successful' student at the University. The perceptions of Student Affairs professionals would provide a better understanding of the influence that factors such as the development of leadership and teamwork skills have on retention.
7. Further retention research at this institution should be conducted using a qualitative research design. A qualitative methodology would provide a framework to more fully explore and explicate the first-year student experience at the university. This research might also provide additional insight into additional factors that impact retention within the specific institutional context for different student populations. For example, the high proportion of first-generation students enrolled at this institution provides a fertile environment in which to study the experiences of first-generation students in the higher education setting.

8. Further research into the Astin typology should be conducted; this research should include an examination into the causes that underlie the differences in the retention seen among these groups of students. In addition, this research should investigate whether survey items from other instruments such as the College Student Expectations Survey (CSXQ) or the Beginning College Survey of Student Engagement (BCSSE) might provide additional insight into the characteristics representative of each of the Astin types. These instruments may include items that further define the existing Astin types or perhaps illustrate a need for revision of the Astin types as defined.
9. Further research of the Astin typology should be conducted using a qualitative research design. Naturalistic inquiry would be a means to develop more rich description of the characteristics defined by each of the Astin types (Lincoln & Guba, 1985).
10. Further research into SI, first-year seminar courses and retention at this institution should be conducted. For example, what accounts for the large effect that SI has on the continued enrollment of students classified as *Hedonist*, which was the group with the lowest rate of retention. A future study of first-year seminar should include a larger sample, in order to better understand the impact the courses have on retention of different groups of students.



### **Closing**

The public demand for higher education to educate the expanding college student population will continue. At the same time the population of college students grows, several shifts will continue within the college-going population. Many of these new students may be the first member of their family to enter higher education. Many of these new students may not be fully prepared for the new demands of the college environment. Therefore, developing a localized model of success that assists students, their families, and educators to make decisions that promote student persistence is going to become more and more important. A key element for these local models to be effective will be the ability of the models to facilitate the early identification of at-risk students, and in so doing allow educators to provide pro-active support for the successful transition of more students into college or university environment.

The study of college student persistence and retention is complex. This study provided evidence that the Astin typology is viable as a means of studying the differences in retention among college student populations. The study revealed that environmental factors hold greater influence over retention than input factors. Finally, this study provided further evidence that academic support programs such as SI and first-year seminar courses are effective methods to promote college student persistence.

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APPENDIX A  
COOPERATIVE INSTITUTIONAL RESEARCH PROGRAM (CIRP) FRESHMAN  
SURVEY

PLEASE PRINT NAME AND PERMANENT/HOME ADDRESS (one letter or number per box)

FIRST										LAST										When were you born?		
																				Month (01-12)	Day (01-31)	Year
STATE:										ZIP:					PHONE:							

## 2002 STUDENT INFORMATION FORM

### MARKING DIRECTIONS

responses will be read by an optical reader. Please,

use a pencil or black or blue pen. Fill in the oval completely. Do not use any other marks or "X" out mark if in pen.

**CORRECT MARK** **INCORRECT MARKS**

PLEASE PROVIDE YOUR SOCIAL SECURITY NO.										Mark here if directed	
										GROUP CODE A	GROUP CODE B
0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9

Your sex: ☐ Male ☐ Female

How old will you be on December 31 of this year? (Mark one)

- 16 or younger ☐ 21-24 ☐  
 17 ☐ 25-29 ☐  
 18 ☐ 30-39 ☐  
 19 ☐ 40-54 ☐  
 20 ☐ 55 or older ☐

Is English your native language?

☐ Yes ☐ No

In what year did you graduate from high school? (Mark one)

- 2002 ☐ Did not graduate but passed G.E.D. test ☐  
 2001 ☐  
 2000 ☐ Never completed high school ☐  
 1999 or earlier ☐

Are you enrolled (or enrolling) as a:

(Mark one) Full-time student? ☐  
 Part-time student? ☐

How many miles is this college from your permanent home? (Mark one)

- 5 or less ☐ 11-50 ☐ 101-500 ☐  
 6-10 ☐ 51-100 ☐ Over 500 ☐

What was your average grade in high school? (Mark one)

A or A+ ☐ B ☐ C ☐  
 A- ☐ B- ☐ D ☐  
 B+ ☐ C+ ☐

Dear Student:

This information is being collected as part of a continuing study of higher education conducted by the American Council on Education and the University of California at Los Angeles. Your participation in this research will help us to achieve a better understanding of how students are affected by their college experiences. Detailed information on this research program is available from the Higher Education Research Institute at UCLA. Identifying information has been requested in order to make subsequent mail follow-up studies possible. Your responses are held in the strictest professional confidence.



Sincerely,

*Alexander W. Astin*

Alexander W. Astin, Director  
Higher Education Research Institute

PLEASE USE PENCIL OR BALLPOINT PEN

8. What were your scores on the SAT I and/or ACT?

SAT VERBAL		
SAT MATH		
ACT Composite		

9. Citizenship status:

- ☐ U.S. citizen  
☐ Permanent resident (green card)  
☐ Neither

10. Have you had, or do you feel you will need, any special tutoring or remedial work in any of the following subjects? (Mark all that apply)

	Have Had	Will Need
English	<input type="radio"/>	<input type="radio"/>
Reading	<input type="radio"/>	<input type="radio"/>
Mathematics	<input type="radio"/>	<input type="radio"/>
Social Studies	<input type="radio"/>	<input type="radio"/>
Science	<input type="radio"/>	<input type="radio"/>
Foreign Language	<input type="radio"/>	<input type="radio"/>
Writing	<input type="radio"/>	<input type="radio"/>

11. Prior to this term, have you ever taken courses for credit at this institution?

☐ Yes ☐ No

12. Since leaving high school, have you ever taken courses at any other institution?

	For Credit	Not for Credit
Yes, at a community/junior college	<input type="radio"/>	<input type="radio"/>
Yes, at a 4-yr. college or university	<input type="radio"/>	<input type="radio"/>
Yes, at some other postsecondary school (For example, technical, vocational, business)	<input type="radio"/>	<input type="radio"/>

13. Where do you plan to live during the fall term? (Mark one)

- With my family or other relatives ☐  
 Other private home, apartment or room ☐  
 College dormitory ☐  
 Fraternity or sorority house ☐  
 Other campus student housing ☐  
 Other ☐

14. Is this college your: (Mark one)

- First choice? ☐ Less than third choice? ☐  
 Second choice? ☐ Third choice? ☐

15. To how many colleges other than this one did you apply for admission this year?

- None ☐ 1 ☐ 4 ☐ 7-10 ☐  
 2 ☐ 5 ☐ 11 or more ☐  
 3 ☐ 6 ☐

16. Do you have a disability?

(Mark all that apply)

- None ☐  
 Hearing ☐  
 Speech ☐  
 Orthopedic ☐  
 Learning disability ☐  
 Health-related ☐  
 Partially sighted or blind ☐  
 Other ☐

17. Did your high school require community service for graduation?

☐ Yes ☐ No

18. What is the highest academic degree that you intend to obtain?

(Mark one in each column)

- |                                      |                       |                 |
|--------------------------------------|-----------------------|-----------------|
| None                                 | <input type="radio"/> | Highest Planned |
| Vocational certificate               | <input type="radio"/> | Highest Planned |
| Associate (A.A. or equivalent)       | <input type="radio"/> | Highest Planned |
| Bachelor's degree (B.A., B.S., etc.) | <input type="radio"/> | Highest Planned |
| Master's degree (M.A., M.S., etc.)   | <input type="radio"/> | Highest Planned |
| Ph.D. or Ed.D.                       | <input type="radio"/> | Highest Planned |
| M.D., D.O., D.D.S., or D.V.M.        | <input type="radio"/> | Highest Planned |
| LL.B. or J.D. (Law)                  | <input type="radio"/> | Highest Planned |
| B.D. or M.Div. (Divinity)            | <input type="radio"/> | Highest Planned |
| Other                                | <input type="radio"/> | Highest Planned |

19. Are your parents: (Mark one)

- Both alive and living with each other? ☐  
 Both alive, divorced or living apart? ☐  
 One or both deceased? ☐

20. How much of your first year's educational expenses (room, board, tuition, and fees) do you expect to cover from each of the sources listed below? (Mark one answer for each possible source)

	None	Less than \$1,000	\$1,000-2,999	\$3,000-5,999	\$6,000-9,999	\$10,000+
Family resources (parents, relatives, spouse, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My own resources (savings from work, work-study, other income)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aid which need <u>not</u> be repaid (grants, scholarships, military funding, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aid which <u>must</u> be repaid (loans, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other than above	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. What is your best estimate of your parents' total income last year? Consider income from all sources before taxes. (Mark one)

<input type="radio"/> Less than \$10,000	<input type="radio"/> \$50,000-59,999
<input type="radio"/> \$10,000-14,999	<input type="radio"/> \$60,000-74,999
<input type="radio"/> \$15,000-19,999	<input type="radio"/> \$75,000-99,999
<input type="radio"/> \$20,000-24,999	<input type="radio"/> \$100,000-149,999
<input type="radio"/> \$25,000-29,999	<input type="radio"/> \$150,000-199,999
<input type="radio"/> \$30,000-39,999	<input type="radio"/> \$200,000-\$249,999
<input type="radio"/> \$40,000-49,999	<input type="radio"/> \$250,000 or more

22. Current religious preference: (Mark one in each column)

	Yours	Father's	Mother's
Baptist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Buddhist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eastern Orthodox	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Episcopal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Islamic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jewish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
LDS (Mormon)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lutheran	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Methodist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Presbyterian	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quaker	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Roman Catholic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Seventh Day Adventist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
United Church of Christ	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Christian	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Religion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
None	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

23. My religion treats men and women as equals. (Mark one)

<input type="radio"/> Always	<input type="radio"/> Sometimes	<input type="radio"/> Never
<input type="radio"/> Not applicable		

24. Please indicate the ethnic background of yourself, your father, and your mother. (Mark all that apply in each column)

	You	Father	Mother
White/Caucasian	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
African American/Black	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
American Indian/Alaska Native	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Asian American/Asian	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Native Hawaiian/Pacific Islander	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mexican American/Chicano	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Puerto Rican	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Latino	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

25. For the activities below, indicate which ones you did during the past year. If you engaged in an activity frequently, mark F. If you engaged in an activity one or more times, but not frequently, mark O (occasionally). Mark N (Not at all) if you have not performed the activity during the past year. (Mark one for each item)

	Frequently	Occasionally	Not at all
Attended a religious service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was bored in class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participated in organized demonstrations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tutored another student	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Studied with other students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was a guest in a teacher's home	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smoked cigarettes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drank beer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drank wine or liquor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Felt overwhelmed by all I had to do	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Felt depressed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Performed volunteer work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Played a musical instrument	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Asked a teacher for advice after class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overslept and missed class or appointment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discussed politics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Voted in a student election	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Socialized with someone of another racial/ethnic group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Came late to class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attended a public recital or concert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Visited an art gallery or museum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discussed religion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communicated via e-mail	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Used the Internet for research or homework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participated in Internet chat rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Internet use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Performed community service as part of a class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Used a personal computer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. How many Advanced Placement courses or exams did you take in high school? (Mark one in each row)

	None	1	2-3	4-6	7-10	11+
AP Courses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AP Exams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

27. What is the highest level of formal education obtained by your parents? (Mark one in each column)

	Father	Mother
Grammar school or less	<input type="radio"/>	<input type="radio"/>
Some high school	<input type="radio"/>	<input type="radio"/>
High school graduate	<input type="radio"/>	<input type="radio"/>
Postsecondary school other than college	<input type="radio"/>	<input type="radio"/>
Some college	<input type="radio"/>	<input type="radio"/>
College degree	<input type="radio"/>	<input type="radio"/>
Some graduate school	<input type="radio"/>	<input type="radio"/>
Graduate degree	<input type="radio"/>	<input type="radio"/>

28. How would you characterize your political views? (Mark one)

<input type="radio"/> Far left
<input type="radio"/> Liberal
<input type="radio"/> Middle-of-the-road
<input type="radio"/> Conservative
<input type="radio"/> Far right

29. In deciding to go to college, how important to you was each of the following reasons? (Mark one answer for each possible reason)

	Very Important	Somewhat Important	Not Important
My parents wanted me to go	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I could not find a job	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wanted to get away from home	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To be able to get a better job	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To gain a general education and appreciation of ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To improve my reading and study skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There was nothing better to do	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To make me a more cultured person	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To be able to make more money	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To learn more about things that interest me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To prepare myself for graduate or professional school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A mentor/role model encouraged me to go	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To get training for a specific career	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

30. Rate yourself on each of the following traits as compared with the average person your age. We want the most accurate estimate of how you see yourself. (Mark one in each row)

	Highest 10%	Above Average	Average	Below Average	Lowest 10%
Academic ability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Artistic ability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Computer skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cooperativeness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creativity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drive to achieve	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emotional health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Leadership ability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mathematical ability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Persistence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Popularity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public speaking ability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Religiousness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk-taking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self-confidence (intellectual)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self-confidence (social)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self-understanding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spirituality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understanding of others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Writing ability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



31. Mark only three responses, one in each column.

- (M) Your mother's occupation  
(F) Your father's occupation  
(Y) Your probable career occupation

NOTE: If your father or mother is deceased, please indicate his or her last occupation.

Accountant or actuary	Y	F	M
Actor or entertainer	Y	F	M
Architect or urban planner	Y	F	M
Artist	Y	F	M
Business (clerical)	Y	F	M
Business executive (management, administrator)	Y	F	M
Business owner or proprietor	Y	F	M
Business salesperson or buyer	Y	F	M
Clergy (minister, priest)	Y	F	M
Clergy (other religious)	Y	F	M
Clinical psychologist	Y	F	M
College administrator/staff	Y	F	M
College teacher	Y	F	M
Computer programmer or analyst	Y	F	M
Conservationist or forester	Y	F	M
Dentist (including orthodontist)	Y	F	M
Dietitian or home economist	Y	F	M
Engineer	Y	F	M
Farmer or rancher	Y	F	M
Foreign service worker (including diplomat)	Y	F	M
Homemaker (full-time)	Y	F	M
Interior decorator (including designer)	Y	F	M
Lab technician or hygienist	Y	F	M
Law enforcement officer	Y	F	M
Lawyer (attorney) or judge	Y	F	M
Military service (career)	Y	F	M
Musician (performer, composer)	Y	F	M
Nurse	Y	F	M
Optometrist	Y	F	M
Pharmacist	Y	F	M
Physician	Y	F	M
Policymaker/Government	Y	F	M
School counselor	Y	F	M
School principal or superintendent	Y	F	M
Scientific researcher	Y	F	M
Social, welfare or recreation worker	Y	F	M
Therapist (physical, occupational speech)	Y	F	M
Teacher or administrator (elementary)	Y	F	M
Teacher or administrator (secondary)	Y	F	M
Veterinarian	Y	F	M
Writer or journalist	Y	F	M
Skilled trades	Y	F	M
Laborer (unskilled)	Y	F	M
Semi-skilled worker	Y	F	M
Unemployed	Y	F	M
Other	Y	F	M
Undecided	Y		

32. Mark one in each row:

- 1 Disagree Strongly  
2 Disagree Somewhat  
3 Agree Somewhat  
4 Agree Strongly

There is too much concern in the courts for the rights of criminals	4	3	2	1
Abortion should be legal	4	3	2	1
The death penalty should be abolished	4	3	2	1
Marijuana should be legalized	4	3	2	1
It is important to have laws prohibiting homosexual relationships	4	3	2	1
The federal government should do more to control the sale of handguns	4	3	2	1
Racial discrimination is no longer a major problem in America	4	3	2	1
Realistically, an individual can do little to bring about changes in our society	4	3	2	1
Wealthy people should pay a larger share of taxes than they do now	4	3	2	1
Colleges should prohibit racist/sexist speech on campus	4	3	2	1
Same-sex couples should have the right to legal marital status	4	3	2	1
Affirmative action in college admissions should be abolished	4	3	2	1
The activities of married women are best confined to the home and family	4	3	2	1
People should not obey laws which violate their personal values	4	3	2	1
Federal military spending should be increased	4	3	2	1
The federal government should do more to discourage energy consumption	4	3	2	1

33. Please indicate the extent to which each of the following describes you.  
(Mark one for each item)

- 1 Not at all  
2 To some extent  
3 To a great extent

Searching for mission/purpose in life	3	2	1
Engaging in self-reflection	3	2	1
Appreciating the interconnectedness of everything	3	2	1
Believing in the sacredness of life	3	2	1
Being honest in my relationships with others	3	2	1

34. During your last year in high school, how much time did you spend during a typical week doing the following activities?

Hours per week:	None	Less than 1 hour	1-2	3-5	6-10	11-15	16-20	Over 20
Studying/homework								
Socializing with friends								
Talking with teachers outside of class								
Exercise or sports								
Partying								
Working (for pay)								
Volunteer work								
Student clubs/groups								
Watching TV								
Household/childcare duties								
Reading for pleasure								
Playing video/computer games								
Prayer/meditation								

35. Do you have any concern about your ability to finance your college education?  
(Mark one)

None (I am confident that I will have sufficient funds)	
Some (but I probably will have enough funds)	
Major (not sure I will have enough funds to complete college)	

36. Below are some reasons that might have influenced your decision to attend this particular college. How important was each reason in your decision to come here?  
(Mark one answer for each possible reason)

	Very Important	Somewhat Important	Not Important
My relatives wanted me to come here	Y	S	N
My teacher advised me	V	S	N
This college has a very good academic reputation	V	S	N
This college has a good reputation for its social activities	V	S	N
I was offered financial assistance	V	S	N
This college offers special educational programs	V	S	N
This college has low tuition	V	S	N
High school counselor advised me	V	S	N
Private college counselor advised me	V	S	N
I wanted to live near home	V	S	N
Not offered aid by first choice	V	S	N
I was attracted by the religious affiliation/orientation of the college	V	S	N
I wanted to go to a school about the size of this college	V	S	N
Rankings in national magazines	V	S	N
Information from a website	V	S	N
I was admitted through an Early Action or Early Decision program	V	S	N
The athletic department recruited me	V	S	N
Reputation for campus safety	V	S	N



37. Below is a list of different undergraduate major fields grouped into general categories. Mark only one oval to indicate your probable field of study.

**ARTS AND HUMANITIES**

- Art, fine and applied ..... 1  
 English (language and literature) ..... 2  
 History ..... 3  
 Journalism ..... 4  
 Language and Literature (except English) ..... 5  
 Music ..... 6  
 Philosophy ..... 7  
 Speech ..... 8  
 Theater or Drama ..... 9  
 Theology or Religion ..... 10  
 Other Arts and Humanities ..... 11

**BIOLOGICAL SCIENCE**

- Biology (general) ..... 12  
 Biochemistry or Biophysics ..... 13  
 Botany ..... 14  
 Environmental Science ..... 15  
 Marine (Life) Science ..... 16  
 Microbiology or Bacteriology ..... 17  
 Zoology ..... 18  
 Other Biological Science ..... 19

**BUSINESS**

- Accounting ..... 20  
 Business Admin. (general) ..... 21  
 Finance ..... 22  
 International Business ..... 23  
 Marketing ..... 24  
 Management ..... 25  
 Secretarial Studies ..... 26  
 Other Business ..... 27

**EDUCATION**

- Business Education ..... 28  
 Elementary Education ..... 29  
 Music or Art Education ..... 30  
 Physical Education or Recreation ..... 31  
 Secondary Education ..... 32  
 Special Education ..... 33  
 Other Education ..... 34

**ENGINEERING**

- Aeronautical or Astronautical Eng. .... 35  
 Civil Engineering ..... 36  
 Chemical Engineering ..... 37  
 Computer Engineering ..... 38  
 Electrical or Electronic Engineering ..... 39  
 Industrial Engineering ..... 40  
 Mechanical Engineering ..... 41  
 Other Engineering ..... 42

**PHYSICAL SCIENCE**

- Astronomy ..... 43  
 Atmospheric Science (incl. Meteorology) ..... 44  
 Chemistry ..... 45  
 Earth Science ..... 46  
 Marine Science (incl. Oceanography) ..... 47  
 Mathematics ..... 48  
 Physics ..... 49  
 Statistics ..... 50  
 Other Physical Science ..... 51

**PROFESSIONAL**

- Architecture or Urban Planning ..... 52  
 Home Economics ..... 53  
 Health Technology (medical, dental, laboratory) ..... 54  
 Library or Archival Science ..... 55  
 Medicine, Dentistry, Veterinary ..... 56  
 Nursing ..... 57  
 Pharmacy ..... 58  
 Therapy (occupational, physical, speech) ..... 59  
 Other Professional ..... 60

**SOCIAL SCIENCE**

- Anthropology ..... 61  
 Economics ..... 62  
 Ethnic Studies ..... 63  
 Geography ..... 64  
 Political Science (gov't, international relations) ..... 65  
 Psychology ..... 66  
 Social Work ..... 67  
 Sociology ..... 68  
 Women's Studies ..... 69  
 Other Social Science ..... 70

**TECHNICAL**

- Building Trades ..... 71  
 Data Processing or Computer Programming ..... 72  
 Drafting or Design ..... 73  
 Electronics ..... 74  
 Mechanics ..... 75  
 Other Technical ..... 76

**OTHER FIELDS**

- Agriculture ..... 77  
 Communications ..... 78  
 Computer Science ..... 79  
 Forestry ..... 80  
 Kinesiology ..... 81  
 Law Enforcement ..... 82  
 Military Science ..... 83  
 Other Field ..... 84  
 Undecided ..... 85

DO NOT WRITE IN THIS AREA

38. Please indicate the importance to you personally of each of the following: (Mark one for each item)

- Legend: **N** Not Important, **S** Somewhat Important, **V** Very Important, **E** Essential
- Becoming accomplished in one of the performing arts (acting, dancing, etc.) ..... E V S N  
 Becoming an authority in my field ..... E V S N  
 Obtaining recognition from my colleagues for contributions to my special field ..... E V S N  
 Influencing the political structure ..... E V S N  
 Influencing social values ..... E V S N  
 Raising a family ..... E V S N  
 Having administrative responsibility for the work of others ..... E V S N  
 Being very well off financially ..... E V S N  
 Helping others who are in difficulty ..... E V S N  
 Making a theoretical contribution to science ..... E V S N  
 Writing original works (poems, novels, short stories, etc.) ..... E V S N  
 Creating artistic work (painting, sculpture, decorating, etc.) ..... E V S N  
 Becoming successful in a business of my own ..... E V S N  
 Becoming involved in programs to clean up the environment ..... E V S N  
 Developing a meaningful philosophy of life ..... E V S N  
 Participating in a community action program ..... E V S N  
 Helping to promote racial understanding ..... E V S N  
 Keeping up to date with political affairs ..... E V S N  
 Becoming a community leader ..... E V S N  
 Integrating spirituality into my life ..... E V S N  
 Improving my understanding of other countries and cultures ..... E V S N

39. What is your best guess as to the chances that you will: (Mark one for each item)

- Legend: **N** No Chance, **L** Very Little Chance, **S** Some Chance, **V** Very Good Chance
- Change major field? ..... V S L N  
 Change career choice? ..... V S L N  
 Participate in student government? ..... V S L N  
 Get a job to help pay for college expenses? ..... V S L N  
 Work full-time while attending college? ..... V S L N  
 Join a social fraternity or sorority? ..... V S L N  
 Play varsity/intercollegiate athletics? ..... V S L N  
 Make at least a "B" average? ..... V S L N  
 Get a bachelor's degree (B.A., B.S., etc.)? ..... V S L N  
 Participate in student protests or demonstrations? ..... V S L N  
 Transfer to another college before graduating? ..... V S L N  
 Be satisfied with your college? ..... V S L N  
 Participate in volunteer or community service work? ..... V S L N  
 Seek personal counseling? ..... V S L N  
 Develop close friendships with other students? ..... V S L N  
 Communicate regularly with your professors? ..... V S L N  
 Socialize with someone of another racial/ethnic group? ..... V S L N  
 Participate in student clubs/groups? ..... V S L N  
 Strengthen religious beliefs/convictions? ..... V S L N  
 Participate in a study abroad program? ..... V S L N  
 Drop out of college? ..... V S L N

40. Do you give the Higher Education Research Institute (HERI) permission to include your ID number should your college request the data for additional research analyses? HERI maintains strict standards of confidentiality and would require your college to sign a pledge of confidentiality. ☐ Yes ☐ No

The remaining ovals are provided for questions specifically designed by your college rather than the Higher Education Research Institute. If your college has chosen to use the ovals, please observe carefully the supplemental directions given to you.

41. (A B C D E) 48. (A B C D E) 55. (A B C D E)  
 42. (A B C D E) 49. (A B C D E) 56. (A B C D E)  
 43. (A B C D E) 50. (A B C D E) 57. (A B C D E)  
 44. (A B C D E) 51. (A B C D E) 58. (A B C D E)  
 45. (A B C D E) 52. (A B C D E) 59. (A B C D E)  
 46. (A B C D E) 53. (A B C D E) 60. (A B C D E)  
 47. (A B C D E) 54. (A B C D E) 61. (A B C D E)

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THANK YOU!

APPENDIX B  
ACT-SAT CONCORDANCE TABLE

<b><u>ACT Composite Score</u></b>	<b><u>SAT Score Verbal +Math</u></b>
36	1600
35	1580
34	1520
33	1470
32	1420
31	1380
30	1340
29	1300
28	1260
27	1220
26	1180
25	1140
24	1110
23	1070
22	1030
21	990
20	950
19	910
18	870
17	830
16	780
15	740
14	680
13	620
12	560
11	500

Source: [http://www.collegeboard.com/prod\\_downloads/highered/ra/sat/satACT\\_concordance.pdf](http://www.collegeboard.com/prod_downloads/highered/ra/sat/satACT_concordance.pdf)



## APPENDIX C

## MAJORS BY ENTRY-COLLEGE

**Business**

Accounting  
Economics  
Finance  
General Business  
Management  
Marketing  
Tourism Management

**Education**

Education  
Health  
Kinesiology

**Liberal and Fine Arts**

American Studies  
Anthropology  
Architecture  
Art and Art History  
Classical Studies and Humanities  
Communication  
English  
Geography  
History  
Interior Design  
Mexican American Studies  
Modern Languages (e.g. French, Spanish)  
Music  
Philosophy

**Sciences and Engineering**

Biology  
Chemistry  
Engineering (Civil, Electrical, Mechanical)  
Clinical Lab Sciences  
Computer Science  
Geology  
Information Technology  
Mathematics and Statistics  
Multidisciplinary Sciences  
Physics

**Undecided Majors**

## VITA

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Texas A&M University, *College Station, TX*.  
 Doctor of Philosophy, Educational Administration  
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 August 2008  
 University of Texas at San Antonio, *San Antonio, TX*.  
 Master of Science, Biology  
 August 1993  
 University of Texas at San Antonio, *San Antonio, TX*.  
 Bachelor of Science, Biology  
 May 1991

**Professional Experience**

Office of the Vice Provost for Accountability and Institutional Effectiveness, *University of Texas at San Antonio*  
 Assistant Vice Provost for Assessment (2006 to present)  
 Office of the Vice President for Student Affairs, *University of Texas at San Antonio*  
 Director – Strategic Planning and Administration (2005 to 2006)  
 Tomás Rivera Center for Student Success, *University of Texas at San Antonio*  
 Director (2002 to 2005)  
 Associate Director (2001 to 2002)  
 Assistant Director (2000 to 2001)  
 Academic Counselor (1998 to 2000)  
 Life Sciences, *University of Texas at San Antonio*  
 Student Development Specialist II (1995 to 1998)  
 Research Scientist Associate II (1993 to 1995)  
 Teaching Associate (1993 to 1995)  
 Teaching Assistant (1991 to 1993)